

The Social Determinants of Refugee Health: An Integrated Perspective

By

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## CHAPTER I

### THE SOCIAL DETERMINANTS OF REFUGEE HEALTH: AN INTEGRATED PERSPECTIVE

#### **Introduction**

An individual's health has a profound influence on his or her quality of life, and is therefore a critical element of well-being. Studies of health have historically been approached from a Westernized medical model that emphasizes the individual and his or her personal rights and responsibilities for being healthy, and prioritizes the *treatment* of illness; however, over the past several decades an alternative model has emerged that acknowledges the "social determinants of health" and prioritizes *prevention* of illness and maintenance of health at multiple levels. The social determinants of health include characteristics that are related to how societal resources are distributed and the advantages and disadvantages to which people are exposed. Certain populations experience consistently lower health status than others, and require special attention to understand and alleviate their health burden. Among these, resettled refugees constitute a group of people who have serious and nuanced needs with respect to their health. Many refugees experience extreme hardship prior to and during flight from war, famine, or persecution, and continue to experience difficulties upon resettlement in a host country, all of which seriously affect their health status. This dissertation explores the social determinants of health among this population. I first use existing theory to develop an integrated framework for health (IFH) that can be used to organize thought as well as empirical evidence about a particular group, and to identify gaps in knowledge for future studies. In the introductory chapter I describe this framework and employ it in an overview of refugee health, concluding with an assessment of

the utility of the IFH and next steps. This is followed by three empirically-based chapters that explore important issues related to refugee health status. A concluding chapter summarizes what was learned and the contribution made by this work.

## **Health Disparities**

Paula Braveman defined a “health disparity” as:

A particular type of difference in health or in the most important influences on health that could potentially be shaped by policies; it is a difference in which disadvantaged social groups (such as the poor, racial/ethnic minorities, women, or other groups that have persistently experienced social disadvantage or discrimination) systematically experience worse health or greater health risks than more advantaged groups (2006, p. 180).

Disparities in physical and mental health status between social groups are well-documented. In the US, for example, socioeconomic position (SEP), race, and gender put people at differential risk for illness and death (Jaffe, Stephens, Prevention, Frieden, & Thacker, 2011; Kawachi, Adler, & Dow, 2010; Muntaner, Eaton, Miech, & O’Campo, 2004; D. R. Williams, Mohammed, Leavell, & Collins, 2010). Theories that explain disparities in health status by appealing to social determinants articulate causal processes between one or more social characteristics and differential health status. Nancy Krieger categorized social epidemiological theories into (1) psychosocial theories, (2) theories about the social production of disease or political economy of health, and (3) ecosocial and multilevel theories (2001). These categories are used to organize the discussion below; however, material from other sources is also incorporated. Table 1.1 summarizes major theories, their contributions, and potential weaknesses.

“Psychosocial” theories emphasize perceived status within a social hierarchy, its contribution to stress, and the impact of stress on physiological processes in the body that put individuals at risk for illness. Leonard Pearlin (1989) contributed major conceptual advances in

the study of stress from the sociological point of view. He argued that structural arrangements affect both the stressors to which individuals are exposed and the availability of resources to deal with said stressors. The “stress process” and similar models focus primarily at the individual level and on the mechanisms between social characteristics and illness so that effective intervention points to reduce disparities can be found.

Table 1.1  
*Major Theories for Social Determinants of Health Status*

Theory	Major Contributions	Potential Weaknesses
Psychosocial, Stress, Reserve capacity	Impact of stress on physiological processes, Mechanisms and intermediate variables	Individual focus, Focus on proximal causes, Linear
Social production of health, Fundamental causes	Structural determinants of health, Contexts and root causes	Focus on distal factors that are difficult to intervene upon, Linear
Ecosocial, Ecological systems	Attention to contexts both distal and proximal to the individual, Attention to interrelatedness	Sometimes vague, Often untestable

Other theories emphasize the “structural” determinants of health, drawing attention to the most "upstream" factors—those at the broadest national and international policy and cultural levels—as the cause of social inequality and resulting in health disparities. Because “fundamental causes” of health status (Link & Phelan, 1995) operate through multiple different mechanisms to affect multiple health outcomes, intervention in one pathway may have limited effects because alternative pathways to disease continue to operate. Reducing the prevalence of a downstream risk factor may only alleviate the issue temporarily, as conditions that put people at “risk of risks” will perpetuate disparate health status. This has implications about the target of intervention efforts to reduce disparities, suggesting that action at the most upstream source of

social inequality—as opposed to downstream mediators like stress exposure and social resources—is likely to be most effective.

Lastly, “ecological” theories attend to multiple levels of analysis. Urie Bronfenbrenner (1977) delineated interrelated systems in which the individual experiences development. In the microsystem, individuals interact with each other and with their immediate environment (neighborhood, workplace, etc.); in the mesosystem, microsystem components interact with each other. The exosystem influences the individual indirectly by affecting the immediate settings in which the individual resides (informal social networks, governmental agencies, transportation facilities). Finally, the macrosystem is composed of overarching societal institutions (social, political, economic systems) that are manifested in the three lower systems. Numerous studies have now explored characteristics at the neighborhood and community levels and their relationships to health status, while controlling for individual-level characteristics. Krieger’s own “ecosocial” theory (1994) integrated social, biological, historical, and ecological perspectives. The framework generated by the WHO Commission on Social Determinants of Health (Solar & Irwin, 2007) attributes the social gradient in health both within and between countries to unequal distributions of relevant resources. These structural determinants bear upon conditions of daily life, including access to health care, education, and working conditions. This model could be said to represent a combination of other types of theories, acknowledging multiple levels, bidirectional causal processes, and complex systems of interacting components.

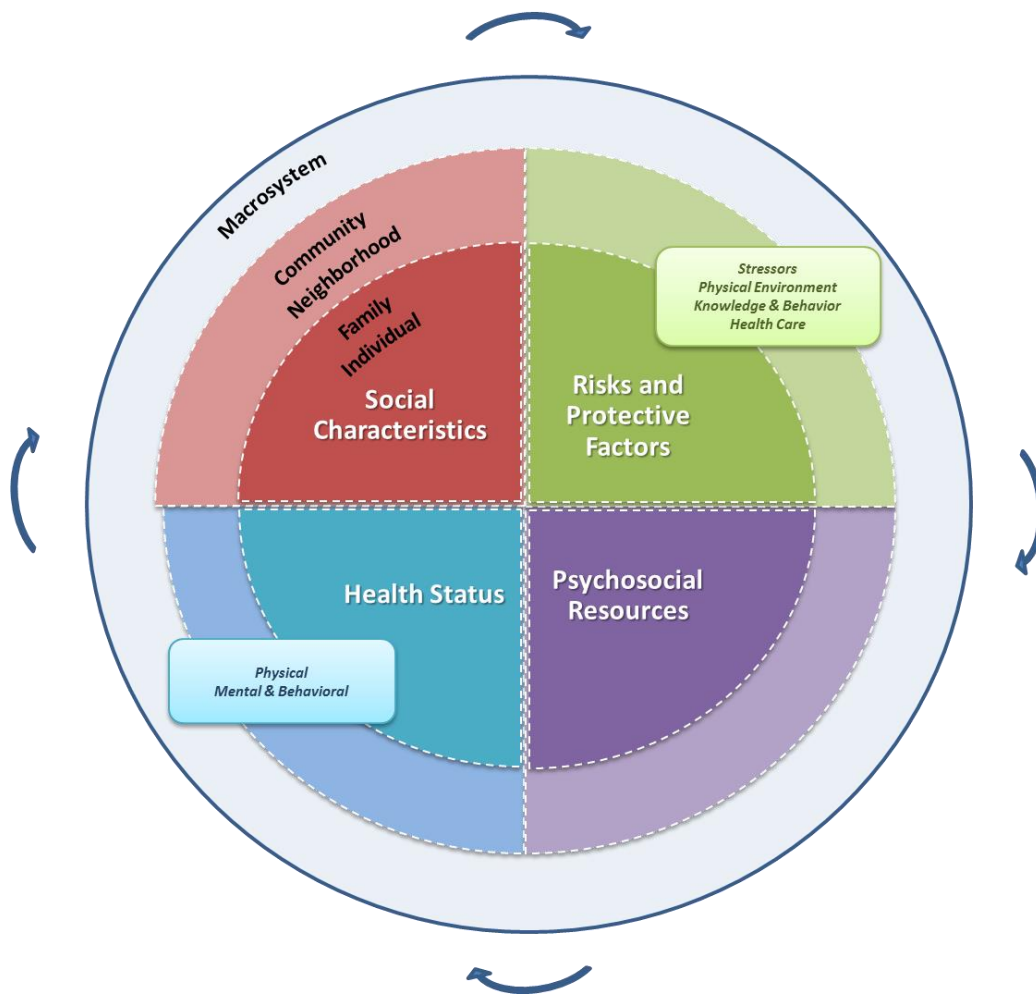
### **An Integrated Framework**

The existing theoretical models are not inconsistent with each other, but have different foci. Psychosocial theories tend to emphasize the individual, although some do reference group-

level constructs, such as neighborhood characteristics. Structural theories tend to lack comment on the intermediate levels, such as the community, and their relationships to the macrosystem, or their roles in producing health disparities. Furthermore, most models hypothesize a generally linear progression from social characteristics through various mediators to health “outcomes.” These are laid out horizontally, so despite the more advanced ideas drawn with double-headed arrows representing reciprocal relationships, these still suggest an artificially linear conception of health processes. Krieger’s ecosocial theory acknowledges the roles of multiple levels, of social and biological processes, and finally, of historical circumstances, which are an oft forgotten contributor to context. Her model also avoids the false linearity implied by other models, as depicted in a “web” of interacting components and contexts. However, in some cases the web may be difficult to translate into testable models and intervention points.

Founded upon existing representations of health processes, Figure 1.1 represents a rudimentary framework labeled the Integrated Framework for Health (IFH) that could be used as a guide to organize the existing literature about a particular population, to identify areas that need more research, or to conceptualize the interrelated processes that operate to produce health status. Key elements and variables can be identified within each category depending on the specific population and context being investigated. The IFH is intended to be flexible and to allow alteration based on new theory and empirical evidence, as well as evolving thought in academe. Some variables may fit into multiple categories or have reciprocal relationships with other variables. As indicated below, there are four main components: (a) social characteristics (b) risks and protective factors (c) psychosocial resources and (d) health status, each spanning multiple levels: the macrosystem, communities, neighborhoods, families, and individuals.

The IFH allows for the complexity of social phenomena. Some elements overlap. Some are relevant at one period or stage of the life; others function throughout the lifecourse. In Figure 1.1, the individual and family levels have been combined (to represent more proximal or downstream contexts), as have the neighborhood and community levels (to represent more distal contexts); however, this decision was made for the sake of simplicity and, in reality, each may represent a distinct environment. The following section will apply the IFH to a particular population—resettled refugees—who fall into multiple socially disadvantaged statuses.



*Figure 1.1.* Integrated framework for health. The four main components are (a) social characteristics (b) risks and protective factors (c) psychosocial resources and (d) health status. These components span multiple levels: the macrolevel, the community and neighborhood levels, and the individual and family levels. The macrosystem provides the structural context in which various relationships manifest between concepts spanning down to the individual level. Elements within each of the major components can affect each other, and can affect elements in other components, even having reciprocal relationships over time.

## **The Health of Resettled Refugees**

International migration is common in the world today, but those who leave their home countries to resettle in another might vary greatly in their characteristics and motivation. The term “immigrant” is commonly used to describe all who relocate to new countries of residence, for any length of time or for any reason; “refugees” represent a special category of immigrants. The U.S. Office of Refugee Resettlement (US ORR) (2008) regards refugees as those “unwilling or unable” to return to their countries of origin because of fear of persecution (whether it be based on race, political opinion, religion, or another category). “Resettled” refugees refer to those who have migrated to a host country, such as the US, to reside in safety from the persecution they flee. Since the mid-1970s, the US has admitted refugees for permanent resettlement, ranging from under 30,000 to over 200,000 in a single year (US ORR, 2011) . Although the makeup of the admitted refugee population changes yearly, major recent sending countries include Cuba, Iraq, Burma, Iran, Bhutan, and Somalia (US ORR, 2011).

Refugees may bear risk factors for illness above and beyond those of their U.S.-born counterparts that put them at a health disadvantage. During flight and during stays in refugee camps or countries of transition, individuals are exposed to communicable diseases and often lack sufficient nutrition. Estimates of trauma among refugees have been quite high, frequently including experiences of torture (Jaranson et al., 2004; Jorden, Matheson, & Anisman, 2009). Even after resettlement in a host country, social and psychological risks may exacerbate previous issues (Zimmerman, Kiss, & Hossain, 2011). In the New Immigrant Survey, controlling for relevant covariates, refugees to the US were less likely to self-report their health as very good or excellent (compared to poor, fair, and good) than were migrants who entered the country with employment visas (Akresh & Frank, 2008). More specific data on refugee health status has been

generated by local studies conducted with only one or a few ethnic groups at a time. Those that address physical health status have tended to focus on infectious diseases as opposed to chronic disease (Patil, Maripuu, Hadley, & Sellen, 2012). Those that have investigated emotional illnesses have found greatly varying prevalence rates. Fazel, Wheeler, and Danesh (2005) reviewed surveys of refugee mental health in seven host countries (excluded studies with  $n < 200$ ) and found cumulative rates of nine percent for current post-traumatic stress disorder (PTSD) and five percent for major depressive disorder. However, a meta-analysis of 35 studies (excluded studies with  $n < 50$ ) found an overall prevalence of 44% for depressive diagnosis and 40% for anxiety (Lindert, Ehrenstein, Priebe, Mielck, & Brähler, 2009). Despite this variation in prevalence estimates, it is clear that refugees represent a group of U.S. residents at serious risk for both physical and mental disorders, and in need of attention by researchers and practitioners.

As described above, refugees are of special concern because they fall into a number of socially disadvantaged categories and because many have had life experiences that put them at exceptional risk for health disparities and disease. According to Williams and colleagues, future research should “characterize all of the risk factors and resources in immigrant populations and identify how they relate to each other and combine to affect health” (2010, p. 84). In the previous section I proposed a framework that incorporated major models of the social determinants of health. In this section, I use that framework to compile key contributors to refugee health, to categorize what we already know about refugee health, and to identify areas that need further exploration. As the reader can see (Table 1.2), elements that represent more specific constructs at the intersections of components (e.g., social characteristics) and levels (e.g., individual) populate the cells of the table (e.g., gender). The macrosystem is conceived as the overarching complex



that gives rise to the very relationships between individual elements, but also between other ecological levels and components.

### **The Macrosystem**

As Bronfenbrenner explained, the macrosystem refers to “general prototypes existing in the culture or subculture that set the pattern for the structures and activities occurring at the concrete level” (1977, p. 515). These include various systems (economic, political, legal, etc.) that “endow meaning and motivation to particular agencies, social networks, roles, activities, and the interrelations.” Each of the systems in which an individual has lived can be highly relevant to his or her development and current circumstances. A Somali refugee resettled to the US, for example, has been exposed to the Somali macrosystem, but also to that in any country of transition and to that of the country of resettlement. He or she is, thus, affected by those settings and the differences between them to which he or she must adapt.

Key macrosystemic elements are displayed in Table 1.2. Relatively little empirical literature refers to these constructs, but there are a number of ways that the macrosystem could impact health status. The social context, for example, includes ways in which different groups of people relate to and treat one another; this makes opportunities and resources differentially available, and affects experiences through mediators at lower levels, such as local patterns of segregation (community level) and discriminatory interpersonal experiences (individual level). Worldwide events can cause changes in these relationships. For example, some Arab immigrants noted that after the year 2001, they experienced more discrimination in the US than they had prior (Garrett, 2006). In addition, macroeconomic processes and political prerogatives could influence public perceptions of migrants, and therefore attitudes and actions toward them. A key

issue for refugees is the status of the conflict that drove them from their native countries; for example, in one study, refugees from places in which conflict remained ongoing experienced worse mental health than those from countries in which the conflict was resolved (Porter & Haslam, 2005). The macrosystem(s) is highly complex, and therefore difficult to define, study, and intervene upon; however, additional research in this area could be of great importance.

Table 1.2  
*The Social Determinants of Health Status for Resettled Adult Refugees*

Components	Elements			
	Individual & Family	Neighborhood & Community	Macrosystem <sup>g</sup>	
<b>Social Characteristics<sup>c</sup></b>	Age	Urbanicity & Rurality	Discrimination	
	Gender	Economic Context <sup>a</sup>		
	Sexual Orientation	Political Context <sup>b</sup>	Distribution of Power	
	Race & Ethnicity	Racial Distribution		
	Socioeconomic Position	Discrimination	Governance	
	Family Structure			
Migration & Integration				
<b>Risks and Protective Factors<sup>f</sup></b>			Economic Context <sup>a</sup>	
	Stressors <sup>d</sup>	Major Life Events & Traumas	Collective Trauma	Political Context <sup>b</sup>
		Chronic Stressors		
		Discrimination Stress		Social Context
		Migration & Integration Stress		
	Physical Environment	Housing Quality	Environment Quality <sup>c</sup> Public & Private Resources <sup>h</sup>	Cultural Norms & Values
Knowledge & Behavior	Alcohol & Drug Consumption		Legislation	
	Smoking			
	Diet & Physical Activity			
Health Care	Access & Use	Availability & Location of Providers Cultural Competence	World Peace / Conflict	
	Unmet Need			
<b>Psychosocial Resources<sup>f</sup></b>			Social Exclusion	
	Psychological Functioning & Affect	Social Capital	Changes to exosystems or reference group	
	Identity			
	Culture & Acculturation			
Interpersonal Relations				
<b>Health Status<sup>f</sup></b>			Institutions, services, and health care systems	
	Physical	Allostatic Load & Cell Aging		
		Mortality & Morbidity		
	Mental & Behavioral	Morbidity		
Idioms of Distress				

<sup>a</sup>Economic context includes trends in the economy (e.g., recession), income inequality, relative deprivation, employment opportunities, etc..  
<sup>b</sup>Political context includes ideologies of persons in power, group-level trends in support for relevant policies or attitudes about certain groups, etc..  
<sup>c</sup>Environmental quality includes such aspects as adequate maintenance, safety, crime, noise pollution, disorder and presence of toxins.  
<sup>d</sup>For those who are foreign-born, the types of stressors measured or included in instruments should reflect those most relevant to those groups.  
<sup>e</sup>For those who are foreign-born, social characteristics in both the country of origin and the host country must be considered.  
<sup>f</sup>For those who are foreign-born, pre-, during-, and post-migration risks, resources, and health status must be considered.  
<sup>g</sup>Macrosystemic components do not fall into the four component categories, but rather collectively provide the context for all other activity.  
<sup>h</sup>These resources include such things as food stores that stock healthy options, the built environment, and recreational facilities.

## **The Neighborhood and Community Levels**

Consideration of an individual's immediate context can involve the neighborhood, the workplace, and other settings in which he or she spends time. There are potential impacts of context (a) directly on health, and (b) indirectly, through pathways that could include variables at any ecological level. Most studies about refugees are small community studies that deal with one or a few refugee groups and do not provide the proper data (sample size or geographic distribution) for multilevel analyses, but comparisons between studies conducted in different communities could be of use in future work. Among general populations, multilevel research has connected neighborhood and community-level constructs to health outcomes, elaborated below.

**Social characteristics.** Relevant characteristics at local settings include urbanicity, economic context, local political context, racial distribution, and discrimination. Unemployment rates and the types of local industries and services could affect what types of jobs are available and how difficult they are to secure. Economic disadvantage in neighborhoods has been associated with poor health and risk factors for chronic disease (Pickett & Pearl, 2001; Truong & Ma, 2006). Economic disadvantage could also be related to the types of businesses that locate there and which services are offered. Perceived neighborhood disorder and fear have been shown to mediate the relationship between neighborhood disadvantage and health status among general populations (Ross & Mirowsky, 2001). Furthermore, disadvantaged environments may confer exposure to stressors, strained personal relationships and reduced trust, environmental toxins, poor housing quality, crime, and limited health care facilities (Williams et al., 2010). There are many potential pathways through which this contextual setting could affect health, and elucidating them is a potential avenue for future research, especially among refugees.

Contexts other than economic are also important. In certain political environments, migrants may be perceived or treated differently by officials or by other residents of the host country. Residential segregation can limit access to high quality education and employment opportunities, thus limiting the potential for economic mobility. For refugees, living in a racially segregated area could function in both advantageous and disadvantageous ways. In a study commissioned by the U.S. Office of Refugee Resettlement using qualitative data about refugee experiences in four cities (Gilbert, Hein, & Losby, 2010), respondents communicated that being segregated by ethnicity or language had a negative effect on their ability to integrate into American society. Initial settlement into neighborhoods with co-ethnics made their transition easier, but limited opportunities to practice English and widen social networks. Not only the current ethnic makeup of the neighborhood, but the historical demographic makeup could be relevant. In a qualitative study conducted with refugees in the UK, researchers found that respondents who lived in neighborhoods with a history of foreign-born residents tended to feel less socially excluded, safer, and experience less discrimination, while those who settled in low-income White neighborhoods with few foreign-born residents experienced hostility, exclusion, and difficulty accessing local services (Spicer, 2008). In a study of Chinese refugees, having more like-ethnic residents in the neighborhood increased the probability of reporting racial discrimination; however, for Vietnamese and Laotian refugees, reported discrimination decreased as the number of like-ethnic residents in the neighborhood increased (Beiser, Noh, Hou, Kaspar, & Rummens, 2001). These complex dynamics and their relationship to health status deserve further study.

**Risks and protective factors.** Table 1.2 includes “risks and protective factors” in four major categories, following Adler & Stewart (2010) who suggested that central nervous system

and endocrine response, health-related behaviors, exposure to carcinogens and pathogens, and access to medical care mediate the relationship of psychological and environmental factors with health status. I have expanded their categories to be more inclusive of additional theory and literature, as well as multiple ecological levels. The biological or chemical environment includes contaminants in the air, water, and soil that can cause respiratory disease, developmental delays, or other mental and physical illness (Adler & Stewart, 2007). In addition, public and private resources, like public transportation, stores that stock healthy foods, businesses, the built environment (including parks, sidewalks, etc.), voluntary organizations, and others, can create contexts that induce or reduce risk for health problems (Adler & Stewart, 2007). For example, numerous studies have explored the relationship of local food and physical activity resources with health behaviors (e.g., Morland, Wing, & Roux, 2002; Saelens & Handy, 2008). The relative number and location of health care providers can affect anyone's ability to access care. In addition to these issues, refugees from other cultures need access to providers who have been trained to deal with health issues in a sensitive and appropriate way that accounts for differing cultural views of illness and treatment (Morris, Popper, Rodwell, Brodine, & Brouwer, 2009; Saha, Beach, & Cooper, 2008). Refugees also often face structural and instrumental barriers, such as lack of access to transportation and very low incomes.

**Psychosocial resources.** Many studies have demonstrated the beneficial role of social capital for mental health status in general populations (e.g., De Silva, McKenzie, Harpham, & Huttly, 2005). Some constructs operate individually (e.g., resources available to a person through social ties can be viewed as an attribute of that person) while others operate in a group way (e.g., the structure of a network has properties, such as density, that bear upon the way that information travels, disease spreads, etc.). Among refugees, the role of social networks may be complex,

aiding in some ways while straining individuals in other ways. For example, in a qualitative study of Somali and Sudanese refugees in Portland, Maine (n = 42), researchers found that females who reunited with family members in Portland were less likely than "free agents" (refugees who arrived without relatives or relative networks) to deviate from traditional customs, including dress, and this may have negatively impacted their ability to work (Allen, 2009).

A unique Canadian study looked at use of health care (dental visits) among non-native English- or French-speakers, and the relationship to social networks (Deri, 2005). Researchers found that for high service use groups, living in an area with a high concentration of group members increased access to care, but for low service use groups, living in an area of high concentration decreased access. Menjívar (2002) showed that Guatemalan women living in Los Angeles sought and accessed medical care through informal peer networks. Thus, social capital and networks seem to be related to health through multiple mechanisms, including conferring resources to individuals (access to services, employment, etc.).

### **The Individual and Family Levels**

The majority of work on health status has been done at the individual level; not only are the data to support such analyses the most abundant, but it is easier to control for confounding characteristics and to draw conclusions about downstream mediators.

**Social characteristics.** Membership in an advantaged social group often affords an individual benefits in other components of the IFH—reduced stress exposure, healthier environments, better access to health care, more resources, and therefore, better health status. The health-related risk associated with a particular gender, SEP, or race in Western society has been studied extensively (Adler & Rehkopf, 2008; Berkman, 2009; Braveman, Egerter, &

Williams, 2011a; Turner, 2010). In addition, special considerations for refugees include a host of variables specific to their cultures and to stages of the migration process.

Categorizations of race are socially and historically constructed (Omi & Winant, 1994), creating differences between groups of people and status hierarchies within societies. Each macrosystem bears upon how race is conceived in other levels (e.g., community, individual). In the US, race and ethnicity are strongly tied to an individual's phenotype, but in the societies from which refugees originate, the meaning of ethnicity could involve one or more of a number of characteristics including nationality, tribe, religion, race, or others (Haines, 2012). Because refugees must adapt to life in the host country, the markers of difference in that country are very relevant, especially those that confer (dis)advantage. In addition, the relative advantage and disadvantage of one's racial group can change when entering a different society.

Socioeconomic position can be indicated by such things as income, employment, and occupational status. Refugees often flee their home countries with few possessions, leaving them in precarious economic standing upon arrival in a country of resettlement. Even more concerning is the difficulty experienced establishing secure income upon arrival. The U.S. ORR Annual Survey (2007) revealed that of the 63% of recently arrived refugees surveyed who had worked since arrival, 21% did not find work until after living in the US for over one year. In addition to the common challenge of speaking a non-native language, foreign-born individuals have described encounters with employers who did not recognize their education or qualifications, and being forced to work in positions of much lower status than their previous positions in their home countries (e.g., Stewart et al., 2008). Being employed in the host country has predicted better health both initially and over time for immigrants to Canada (Newbold, 2009).

At arrival, over half of respondents in the ORR yearly survey (2007) did not speak any English. English-language ability can act as a resource or barrier among foreign-born groups, as low English ability has been shown to affect access to key services, ability to interact with others in the host country, and educational preparedness, in addition to other factors like perceived discrimination (Garrett, 2006; Gilbert et al., 2010). Because language ability has many potential roles, it likely does not have a consistent relationship with health status across all contexts; therefore, it is important to determine the mediators and moderators involved.

**Risks and protective factors.** Risks and protective factors at the individual level have received much attention. Among refugees, stressors are recognized as highly important, along with some psychosocial resources and access to health care.

Often using the Harvard Trauma Questionnaire (Mollica et al., 1992) as a measure of trauma, torture, and other experiences that are far more common in refugees than in the general population (Hollifield et al., 2006; Jaranson et al., 2004; Jeon, Yoshioka, & Mollica, 2001; Marshall, Schell, Elliott, Berthold, & Chun, 2005), studies have shown that trauma has a dose-response relationship with a number of physical and emotional illnesses, even when accounting for relevant covariates (e.g., Bhui et al., 2003; Jaranson et al., 2004; Marshall et al., 2005; Steel, Silove, Phan, & Bauman, 2002). During migration, factors such as the length and conditions of the flight process, living in a refugee camp, living in another flight country before being resettled, and the amount of prior planning before flight (Haines, 2012) may be important.

Chronic stressors are also important for refugees (Miller & Rasmussen, 2010a). Smaller community studies have used checklist measures (e.g., Silove, Sinnerbrink, Field, Manicavasagar, & Steel, 1997) to assess stressors that are ongoing, such as difficulty adjusting to the new country. Such stressors are often related to psychological distress or other mental health



problems (e.g., Lindencrona, Ekblad, & Hauff, 2008; Schweitzer, Brough, Vromans, & Asic-Kobe, 2011). One example—being separated from one’s family—is very common among refugees and could confer exceptional stress on an individual. A study conducted in Canada (Rousseau, Mekki-Berrada, & Moreau, 2001) found that 80% of sampled refugees (n = 113 from Latin America and Africa) arrived in Canada without their spouse and/or children and 62% of those arrived without any of their family. When interviewed several years later, only 32% had been reunited with their entire immediate families. In another study, participants with immediate family in Iraq reported more symptoms of PTSD and depression, and greater mental health-related disability than those without family in Iraq (Nickerson, Bryant, Steel, Silove, & Brooks, 2010). Intrusive fears about family independently predicted risk of PTSD, depression and disability after controlling for trauma exposure and current living difficulties.

An individual's perception of experiencing racism, sexual identity discrimination, or discrimination related to another social characteristic have also been studied as potential contributors to ill-health among minority populations (Paradies, 2006). A recent meta-review of 134 samples looking at perceived discrimination showed consistent negative relationships with both physical and mental health (Pascoe & Richman, 2009).

Additional complexities are generated by the processes of migration and integration. Often termed “acculturative stress” (Berry, 1970), the stress that arises from navigating a transition between two cultures or contexts, is a popular topic of current research among migrants. One review found that acculturative stress was consistently predictive of increased psychological distress in Latino adults (depression symptoms, anxiety, suicidal ideation) (Umana-Taylor & Alfaro, 2009). Although the concept of acculturative stress has been harshly criticized (e.g., Rudmin, 2009), it continues to be used by many researchers.

Stress from differences between origin and host country situations bear on most other sections of the IFH model. Some foreign-born individuals reported that the social networks they had relied on for multiple types of support in the country of origin were, after settling in the host country, smaller, less resourced, or harder to maintain (Stewart et al., 2008). In another study, those who were well-educated or held occupations with high social status in their home country found themselves in jobs with very low status in the receiving country (Stoll & Johnson, 2007).

Individual experiences of stress are clearly important, but some argue that acculturation represents a “shared family experience” (Chun, 2006, p. 63). Family dynamics can generate or alleviate stress for everyone, but for migrant families, there can be added concerns that relate to differential adjustment of various members or generations, sometimes referred to as the “acculturation gap” (Birman, 2006).

In general populations, those who live in better quality housing (fewer structural deficiencies, infestations, etc.) have tended to have better psychological health, although the mechanisms are not completely understood; housing could affect health through mediators such as stigma, security, social support, and sense of control (Evans, Wells, & Moch, 2003). Although migrant housing situations in Canada tend to improve over time, refugees (compared to other migrant categories) have tended to fare worse (Hiebert, 2009), potentially putting them at increased risk for negative health status due to housing or environmental conditions.

Health care services can prevent some types of illness or treat illness once it occurs. Among migrant populations, there are numerous issues that have an impact on ability and willingness to access services, as well as the effectiveness of those services in maintaining health. Racial and ethnic disparities in health care in the US have been persistent across the general population and have ranged across many types of illnesses (Smedley, Stith, & Nelson,

2003), even when controlling for other factors like insurance status, income, and health conditions (Nelson, 2002). For refugees, access to health care has also been hindered by language barriers, lack of financial resources, lack of knowledge about health issues, and lack of ability to navigate systems to access services (e.g., Sheikh-Mohammed, MacIntyre, Wood, Leask, & Isaacs, 2006). A review of migrant studies in Canada noted that migrants might avoid seeking mental health services even when experiencing distress, due to a number of reasons including transportation difficulties, lack of time or work leave, lack of translation services, or concerns about dealing with problems on one's own, how well one will be understood, or stigmatization (Kirmayer et al., 2011).

**Psychosocial resources.** All people have personal and social resources available to them that can help them to avoid negative experiences that affect health status, and to deal with such experiences when they occur. Some of the major psychological variables used in studies of the social determinants of health include *sense of control*, *self-esteem*, *coping*, *John Henryism*, *negative affect*, *hostility*, *optimism*, *purpose in life*, and others. Such variables are not used consistently across studies of migrants, and results vary, offering little conclusive evidence of the importance of these characteristics. Among the general US population, studies do suggest that personal psychological characteristics are involved in the stress process. Increased self-esteem, mastery, and optimism, for example, are all considered protective factors that moderate the relationship between stress exposure and health status (Turner, 2010). However, psychological variables conceived and tested among Westerners may not apply well to those from highly different cultural backgrounds, as culture influences what is perceived, what is communicated, and how it is communicated by both the patient and the health professional (Fernando, 2010).

Identity includes many different aspects of self and perception. One can have identities related to *ethnicity, culture, nationality, gender, religion, subjective social status*, and others. Phinney (2003, p. 63) defined ethnic identity as "a dynamic, multidimensional construct that refers to one's identity or sense of self as a member of an ethnic group." Identities related to any of the above characteristics could relate to health status. Certain identities may also be intertwined with another type of psychosocial resource—culture and acculturation. Sam and Berry (2010) describe acculturation as the process that occurs as a cultural group or member of a cultural group encounters another, and the changes that take place in one or both people or cultures as a result of this interaction. In most social science studies, acculturation has been conceived of and measured as an individual process or attribute. Schwartz and colleagues (2010) contended that practices (e.g., language use and food choices), values (e.g., collectivism and familism), and identifications (e.g., with the country of origin and the receiving country) represent distinct dimensions that should be measured as such. Some conceptions of acculturation limit the construct to one dimension—a continuum with the native or ethnic culture on one end and the host or reception culture on the other; other conceptions are bidimensional, asserting that one continuum refers to the level of native culture retention and another continuum allows for the embrace or rejection of the host culture (Lara, Gamboa, Kahramanian, Morales, & Hayes Bautista, 2005). Many researchers have interest in the process of acculturation and whether varying trajectories impose risks (or alternatively, protections) for illness. Especially in light of the immigrant paradox, in which some groups of immigrants exhibit better health status than the U.S.-born, understanding the source of this advantage may have important applications. It should be noted that criticism has fallen on the concept of acculturation itself (Hunt, Schneider, & Comer, 2004), its theoretical foundations, and its measurement (Rudmin, 2009).

Culture is difficult to define and neither the host nor the new group is necessarily homogenous; definitions and dimensionality of acculturation are inconsistent across studies; and acculturation is often confounded with acculturative stress and other types of stress that are unrelated to acculturation (Hunt et al., 2004; Rudmin, 2009; Thomson & Hoffman-Goetz, 2009; Zambrana & Carter-Pokras, 2010). Due to the use of proxy measurements (such as time in the US or English-language ability), some studies of acculturation could be tapping into associated issues (such as prolonged exposure to stressful events), but miss core concepts like values and beliefs (Abrido-Lanza, Armbrister, Florez, & Aguirre, 2006). Despite these challenges, the array of concepts termed acculturation has implied risk for some negative health outcomes and protection against others (Koneru, Weisman de Mamani, Flynn, & Betancourt, 2007). There are many potential pathways through which acculturation could affect health, including behaviors, access to care, social support and networks, values, definition of a social reference group and acceptance by that group, and change in SEP (Franzini, Ribble, & Keddie, 2002).

Characteristics at the individual level that are nonetheless social in nature can also be important. For example, the “amount” or “quality” of social support that one perceives in his or her life is protective for health among many different populations (Cohen, Underwood, & Gottlieb, 2000). The types of support that are needed for immigrants and refugees may be culturally-specific, and may also change over time (Stewart et al., 2008). The above psychological and social “resources” available to individuals may interact with one another and affect health in unknown ways; these relationships deserve further exploration.

**Health status.** The Integrated Framework for Health follows major theories about the social determinants of health that predict that social characteristics, risk and protective factors, and psychosocial resources at various levels interact to affect health and illness at the individual

level. Health status, itself, can serve both as an “outcome” of these processes, but also an integral component that feeds back into these interactions. For example, emotional illness can contribute to or be contributed to by physical illness (Cohen & Pressman, 2006; Pressman, Gallagher, & Lopez, 2013).

Studies of refugee health have tended to focus on communicable diseases or several specific behavioral disorders (PTSD, depression, anxiety). Large studies have often used self-rated health as a general measure of health status. Other specific illnesses have been explored in fewer studies, and thus there is less solid ground on which to base conclusions for them. Newer techniques, such as measuring allostatic load or cell aging from blood samples, have not yet been applied to this population. It is important to emphasize again, that because the understanding of illness is influenced greatly by culture, the diagnosis of disorder, especially behavioral disorders, can be highly complex. For example, in comparing Anglo-Australian accounts of depression with those of Somalis and Ethiopians, Kokanovic and colleagues (2008) discovered key differences in the ways that distress was understood and expressed. Even within each cultural group, consensus was not reached when defining specific constructs like depression. Others have noted the difficulty of diagnosing patients from other cultures because of comorbidity and the reluctance to discuss traumatic experiences (Kroll, Yusuf, & Fujiwara, 2011).

## **Summary**

A recent review identified nearly 200 relevant articles in Canada alone that focused on the health status of refugees (Patil et al., 2012). Of these studies, only 10% were longitudinal (more than half of those by the same first author); almost half dealt with mental health and focused on trauma, war, and resettlement issues as predictors. In the Canadian literature, studies

with South or South-East Asian refugees have been the most numerous (Patil et al., 2012). There are similarities in the research on refugees resettled to the US, and although this literature is abundant, there is much we still need to know.

**Beyond the individual level.** Some studies of health status have included relationships between macrosystemic components and individual health status, but these studies are rare, and those with refugees are even rarer. Although not as extreme, the same is true for studies of local contexts, like economic and political climates. The contribution of racial or ethnic segregation in the health status of migrants is unclear, as some studies have shown it to be protective and others risky. In addition, studies of adult refugees usually overlook family dynamics that could be extremely relevant to health and well-being. Especially among these groups, who deal with acculturation and often family separation, the family should be included in our understanding of health status. Finally, research on health care providers, systems, and treatment efficacy can be integrated into the broader research on refugees to understand more about the impact of cultural competence and related attributes of services and providers.

**Specific groups and comparisons.** Refugee research represents a smattering of various ethnic groups and populations across communities in numerous countries. Despite the hundreds of studies available, we lack enough research on any particular group or setting to make concrete conclusions and/or recommendations beyond the obvious. Very few systematic reviews exist that assess literature involving refugees, and these would be very helpful in gaining a firmer understanding of health status and its determinants. In addition, there is little comparative research that takes advantage of the variability in predictors across groups or different resettlement locations to consider what types of circumstances or characteristics might be advantageous for resettling refugees.

**Theory and complex relationships.** Even among individual-level characteristics, complex relationships exist that have yet to be identified fully. Empirical studies with refugees are often descriptive and lack theoretical foundations or guiding frameworks. When contradictory evidence is found for the role of a particular variable (e.g., English ability), then theory should be developed to explain why this is the case—which other variables may moderate the effects to generate differential outcomes, and which other variables influence health status as mediators. In addition, different disciplines focus on different predictors and outcomes. Some disciplines investigate characteristics of refugees that are related to health but because the focus is on some other outcome (e.g., financial independence, employment, etc.), data collected by these researchers, as well as their insights may not be applied to studies of refugee health status or appear in the literatures of health disciplines. Lastly, longitudinal studies are needed to investigate changes in key variables over time and to attribute causality.

### **Implications and Conclusions**

Research on health disparities and the social determinants of health is abundant, and has shown that disparities by social characteristics not only exist, but also persist over time. Resettled refugees are an important and growing population in the US with special health needs that are not well-understood. This paper has used existing literature on refugees supplemented by that based on migrants and general populations, to identify a large number of the variables that interact in complex ways to contribute to refugee health status. That literature was organized using an Integrated Framework for Health that draws from major theories asserted by experts across the social sciences. This IFH is comprehensive, yet highly flexible. It provides the skeleton necessary to consider a broad range of components and factors, as well as their



relationships within and between ecological levels. The framework allows for reciprocal relationships, embedded contexts, and nonlinear processes. It can be used to generate thought about the many contributors to health and their interrelatedness. As shown in Table 1.2 for refugee groups, categorizing each variable and construct is difficult but can help us conceptually understand and organize factors that intervene in the processes that lead to health status.

Systematic work is needed to solidify our understanding of relationships between key variables without becoming overwhelmed by the number and complexity of these phenomena. One place to start is with stronger study designs and by filling in research gaps that were described above. One reason for this deficiency is the lack of data that supports sophisticated analyses. Few datasets about refugees have large sample sizes, multilevel structures, or multiple time points; however, those that do (e.g., the United Kingdom Survey of New Refugees or the Longitudinal Survey of Immigrants to Canada) are providing key opportunities.

In addition to new empirical studies, literature reviews of existing studies are needed in order to synthesize the work that has already been done and provide recommendations for specific directions. It is important to have an understanding of certain variables across refugee groups (e.g., how does acculturation relate to health status among refugees?) and of individual refugee groups across components of the IFH (e.g., for Somali refugees resettled to Westernized countries, what do we know about the factors listed in Table 1.2 and where are the gaps that future research should address?). Because of the diversity of variables, respondent populations, and methods, there may not be enough literature in certain areas yet to provide for a systematic review; however, these would be very helpful in gaining a clearer sense of the state of the field of refugee studies. A rich qualitative literature on refugees and immigrants exists that can be tapped to more fully understand the intricacies of experiences of acculturation and context

navigation. In quantitative studies, we must probe interaction effects between ecological levels (e.g., neighborhood to individual), between categories (e.g., psychosocial resource moderation of the effect of stressors on health status), and within categories (e.g., the relationship between the physical environment and the generation of stressors). We must understand more about mediators to identify specific mechanisms in the pathway of social characteristics to health status (e.g., does exposure to stressors mediate the relationship between social characteristics and health status for refugees). Finally, researchers should seek interdisciplinary partnerships and teams so that progress in each field can contribute to the other and so that study designs can benefit from multiple expertise, perspectives, and theories.

With these improvements and with continued research, modern sciences have the potential to understand the issues that are critical for resettled refugees more fully and to clarify complex processes. This knowledge could help to design interventions at multiple levels (with individual and families, in neighborhoods and communities, within or among governments at the policy level, etc.). The IFH is a useful tool that advances one step closer to these goals and that can be adapted, modified, and improved over time, as well as applied to other populations of interest. Below I describe a series of three empirical studies that use the IFH as a guiding theoretical framework in order to contribute to these research needs.

### **Overview of Empirical Chapters**

The three empirical papers that follow (chapters two-four) focus on the health status of refugees resettled to industrialized countries. Chapter two employs latent growth curve modeling (Bollen & Curran, 2005) to investigate the functional form and correlates of self-reported emotional and physical health status over time among Somali and Iraqi refugees resettled to the

United Kingdom. This paper addresses several of the major gaps described in the previous summary. Longitudinal data affords the opportunity to look at changes in health status over time; the separate assessment of refugees from two different countries of origin allows the comparison of these populations with each other such that differences might suggest key factors beyond the individual level that affect not only health status but the relationships between the variables involved in producing health status; finally, the model tested is based on a theoretical framework (the IFH) that can be partially evaluated and improved based on the results. Chapter three questions the role of life stressors in producing health status using data from a small community study conducted in Nashville, TN. It serves to provide descriptive data on the stressors that are experienced by Somali refugees that can inform local service delivery. Moreover, the study considers both traumatic and chronic stressors as predictors of health status as well as potential mediators between social characteristics and health status. Chapter four explores the relationship between acculturation and health status among Somali refugees resettled to Nashville, TN. This chapter not only utilizes rich qualitative data that taps into multiple components of the IFH, but blends quantitative data as well to explore the contributions to knowledge offered by proxy measures of acculturation. Finally, chapter five ties together the underlying theoretical framework and information gleaned from the three empirical studies to comment on the adequacy of the framework and available methods and data. I conclude with directions for future research. A summary of each of the three empirical chapters and how they relate to the Integrated Framework for Health (IFH) appears in Table 1.3. Data limitations (primarily small sample size) prevent testing of many different relationships in any one study, but taken together, these empirical papers cover some of the key elements of the IFH and contribute to knowledge about not only refugee health status, but also health in general.

Table 1.3  
*Summary of Empirical Chapters*

Chapter Title	Research Questions	Key Components of IFH Addressed	Data Source	Data Analysis Approach
<p>CHAPTER 2</p> <p>Refugee health status over time: A latent growth curve analysis of Somalis and Iraqis resettled to the UK</p>	<ol style="list-style-type: none"> <li>1. Among Somali and Iraqi refugees resettled to the UK, what are the trajectories over time (initial status, functional form, and average rate of change) for emotional and physical health?</li> <li>2. How are emotional health and physical health related to each other <i>within</i> each refugee group?</li> <li>3. How do the trajectories of health status (for both physical and emotional health) differ between Somali and Iraqi refugees?</li> <li>4. How are the trajectories of health status affected by sociodemographic characteristics at baseline (sex, age, education)? Do these predictive relationships differ across refugee groups (Somali v. Iraqi)?</li> </ol>	<p>Society of origin            General health            Emotional health            Social characteristics</p>	<p>UK Survey of            New Refugees</p>	<p>Latent Growth            Curve Modeling</p>
<p>CHAPTER 3</p> <p>Understanding stressors and health: Perspectives from Somali refugees in a Southeastern city</p>	<ol style="list-style-type: none"> <li>1. What are the most prevalent stressors reported by Somali refugees living in Nashville?</li> <li>2. Do Somali refugees show relationships between stressors and health status that have been shown in other populations? Specifically,               <ol style="list-style-type: none"> <li>a. Is membership in a disadvantaged social group (sex, age, education) associated with higher exposure to stressors?</li> <li>b. Is higher exposure to stressors associated with poorer health status? Are some stressors more salient than others?</li> <li>c. To what extent does exposure to stressors mediate the relationship between disadvantaged social status and poorer health status?</li> </ol> </li> <li>3. How are different types of health status (physical, emotional) related to each other in this population?</li> </ol>	<p>General health            Physical limitation            Emotional health            Social characteristics            Traumatic stressors            Chronic stressors</p>	<p>Nashville            Refugee            Health Study:            Survey            Component</p>	<p>Logistic            Regression</p>
<p>CHAPTER 4</p> <p>Understanding acculturation: The health status of Somali refugees in a Southern US city</p>	<ol style="list-style-type: none"> <li>1. How do Somalis resettled to Nashville understand the process of acculturation and adjustment to life in the America? Specifically, what changes occur in values, identities, and behaviors? Why and under what circumstances do these changes occur?</li> <li>2. In what ways and under what circumstances might acculturation or adjustment relate to health status?</li> <li>3. What is the relationship between quantitative proxy measures of acculturation and health status among Somali refugees? What is the relationship between what is gleaned from the proxies and what is gleaned from the qualitative data?</li> </ol>	<p>General health            Emotional health            Acculturation</p>	<p>Nashville            Refugee            Health Study:            Focus Group            and Survey            Components</p>	<p>Qualitative            Analysis &amp;            Logistic            Regression</p>

## CHAPTER II

### REFUGEE HEALTH STATUS OVER TIME:

#### A LATENT GROWTH CURVE ANALYSIS OF REFUGEES IN THE UK

### **Introduction**

Health status is a central component of well-being and can affect (and be affected by) numerous other aspects of life. Industrialized countries that have committed to resettling refugees who cannot return to their home countries must attend to their health needs through established health and social systems. A better understanding of risk factors among refugees can help such systems predict, prevent, and treat illness. An extensive literature investigates the health status of individuals who migrate to industrialized countries, including the tendency among some groups for health status to decline over time after migration following initial positive health status (e.g., Franzini et al., 2002). This pattern is surprising given the tendency for international migrants to fall into disadvantaged social categories. Refugees, however—those who have fled or been forced to leave their home countries—may or may not follow the same patterns as those who migrate voluntarily, and many fewer studies have focused specifically on refugees than on immigrants in general. Specifically, we know little about the trajectories of health status for refugees, the dynamics between emotional and physical health, the differences between refugees from different source countries, and the predictors of health status over time. It is important to investigate these patterns in order to design services to best meet their needs.

This study utilized existing data from the United Kingdom (UK) Survey of New Refugees, a longitudinal survey of individuals resettled to the UK in the late 2000's over the first

21 months after being granted asylum. Refugees to the UK come from dozens of different countries around the world; this series of analyses looked specifically at those from Iraq and Somalia for several reasons. Selecting two countries of origin allowed comparisons of not only the trajectories of health status over time, but also whether the relevant predictors of these trends differed between groups. This knowledge can assist in the design of interventions that are tailored to the groups served and enhance effectiveness. These particular groups were chosen because they were both present in high enough numbers to provide sufficient data for such an analysis, because there are marked cultural and historical differences between the countries of origin that could account for differences in health status, and because these groups have resettled in great numbers to other industrialized countries, such that future analyses could compare these findings to those that might be done in other countries of resettlement. The paper begins with a brief background in the empirical literature, relevant theory, and a description of the gaps that led to the research questions addressed in this paper, followed by the analytical methods and results. It concludes with implications and suggestions for future research.

### **Background**

For the purpose of this paper, “migrant” refers to those who leave an area of origin and resettle to another area, voluntarily or involuntarily, and for any reason. The subgroup of present concern is “refugees,” a class of migrants who have fled their homes out of necessity in fear of persecution. Refugees are at high risk of experiencing trauma (Jaranson et al., 2004; Jorden et al., 2009), which can occur prior to, during, or after flight. Many have been exposed to communicable diseases and lacked sufficient nutrition. Industrialized countries that accept refugees for permanent resettlement have reported relatively poor health for these individuals in

comparison with other categories of international migrants. For example, in the New Immigrant Survey, refugees to the US were less likely to self-report their health as very good or excellent (compared to poor, fair, and good) than were migrants who entered the country with employment visas (Akresh & Frank, 2008). Refugee studies that address physical health status have tended to focus on infectious diseases as opposed to chronic disease (Patil et al., 2012), and prevalence rates for emotional illnesses among refugees have varied greatly between studies. Fazel, Wheeler, and Danesh (2005) reviewed surveys of refugee mental health in seven host countries and found cumulative rates of nine percent for current post-traumatic stress disorder (PTSD) and five percent for major depressive disorder. However, this review excluded studies with small ( $n < 200$ ) sample sizes, and thus included a very limited variety of refugees. A meta-analysis of 35 studies (each with  $n > 50$ ) found that the overall current prevalence of refugee depression was 44%, and anxiety was 40% (Lindert et al., 2009), although again, prevalence rates from individual studies varied greatly.

The past several decades have seen models of the "social determinants of health" emerge that prioritize *prevention* of illness and maintenance of health at multiple levels (from the individual to his or her community to national and international policies). The social determinants of health include characteristics that are related to how societal resources are distributed and the advantages and disadvantages to which people are exposed. The Integrated Framework for Health (IFH), (Lunn, 2014b) is a tool that combines the leading theories in this area and assists in identifying potential contributors to health status and testable models. The IFH considers social characteristics, risks and protective factors, and psychosocial resources across ecological levels from the individual to the community to the macrosystem.

In the UK and other countries, social characteristics such as low socioeconomic position (SEP) and minority race have consistently been shown to put people at higher risk for illness and death (e.g., Wilkinson & Marmot, 2003). Resettled refugees often fit into both categories. Many arrive in the host country with few possessions and no wealth, low levels of education, and credentials that are unrecognized by employers. Somalis and Iraqis are visible ethnic minorities in the UK, may or may not speak the majority language (English), and are very likely to identify as Muslim (as opposed to Christian, the majority religion in that country).

For refugees, stressors may be the most salient category of risk. Studies have shown that trauma has a dose-response relationship with a number of physical and emotional conditions, even when accounting for relevant covariates (e.g. Bhui et al., 2003; Jaranson et al., 2004; Marshall et al., 2005; Steel et al., 2002). However, psychosocial resources may buffer negative effects of other factors. These include individual psychological traits like optimism and self-esteem as well as social resources like various types of support (Turner, 2010). Unfortunately, few studies of refugees have collected such data, and even fewer have tracked them over time.

Longitudinal studies of refugees are rare, and few analyses have been published about health status over time. National data from Australia indicated that refugees had lower initial self-rated health and that their health declined more over time compared with migrants in other categories of visa (Chiswick, Lee, & Miller, 2008). Longitudinal data from Canada showed that the health of all migrants declined over time; however, when controlling for covariates, refugees were far more likely than economic migrants to fall into the lower categories of self-rated health, and to transition to “poor” rated health between waves two and three (Newbold, 2009).

Using data from the UK, this analysis contributes additional information about refugee health status over time. The research questions are as follows:



1. Among Somali and Iraqi refugees resettled to the UK, what are the trajectories over time (including initial status, functional form, and average rate of change) for emotional health and for physical health?
2. How are emotional and physical health related to each other *within* each refugee group?
3. How do the trajectories of health status (for both physical and emotional health) differ between Somali and Iraqi refugees?
4. How are the trajectories of health status affected by sociodemographic characteristics at baseline (sex, age, education)? Do these predictive relationships differ across refugee groups (Somali v. Iraqi)?

Based on the extant—although limited—literature, low initial rates of health status and a linear decrease over time were expected. Consideration of which nationality group would fare better than the other over time was exploratory; however, it was predicted that male gender, younger age, higher education, and having lived in the UK for less time before asylum decision would be associated with higher initial health status and lower decline in health over time for both groups.

## **Methods**

This is a secondary analysis of existing data. Information about the dataset includes a summary of attrition issues and what was done to mitigate them. The model-building section is organized by research question.

## **Data**

The U.K. Survey of New Refugees was carried out by the U.K. Border Agency of the Home Office. Permission and access for this study were granted through the U.K. Data Archive.

The study design is described in more detail elsewhere (Daniel, Devine, Gillespie, Pendry, & Zurawan, 2010). This study was reviewed by the Vanderbilt University Institutional Review Board and granted exemption status as analysis of existing data without identifiers.

**Sample.** Individuals seeking refuge from persecution in their home countries may apply for asylum upon arrival in the UK. The UK maintains a Border Agency Caseworker Information Database (CID) from which information about every individual granted a positive asylum decision, humanitarian protection, or discretionary leave to remain in the UK between December 1, 2005 and March 25, 2007 was obtained. Each individual receiving a positive asylum decision was mailed a survey one week after the decision, and a reminder card two weeks later. Wave two questionnaires were distributed eight months later; wave three at 15 months, and wave four 21 months after the asylum decision.

For the first wave (one week after asylum decision), 5,678 questionnaires were included in the total dataset (out of 7,765 distributed; response rate of 73.12%). At that time, 758 respondents were from Somalia (13.35%) and 504 were from Iraq (8.88%). Respondents from these two countries of origin represented the second and third largest groups in the total dataset. Over the next three waves, response rates decreased (see Table 2.1), with the most marked change between waves one and two. Although researchers did request notification of address changes, they were not able to track many of the respondents.

**Questionnaire.** The questionnaire was a product of literature review, emergent themes from focus groups with refugees, and input from community organizations that provide services to refugees. Review by an expert panel and cognitive interviews with refugees were done to test the instrument. The final version included questions about demographics, employment, English language ability, health, social support, and service needs. The questionnaire was translated into

Table 2.1

*Descriptive Characteristics for Somali and Iraqi Samples from the UK Survey of New Refugees*

	Baseline (t=0)		8 Months (t=1)		15 Months (t=2)		21 Months (t=3)	
	<i>Somali</i>	<i>Iraqi</i>	<i>Somali</i>	<i>Iraqi</i>	<i>Somali</i>	<i>Iraqi</i>	<i>Somali</i>	<i>Iraqi</i>
<i>Sample Size</i> (% of original sample)	758 (100)	504 (100)	169 (22.30)	175 (34.72)	102 (13.46)	125 (24.80)	71 (9.37)	98 (19.44)
<i>Independent variables</i> (time-invariant)								
Male, %	56.10	86.00					56.34	76.29
Age ≥ 45 yrs, %	17.01	10.46					20.59	13.40
Education ≥ 7 yrs, %	24.87	68.07					42.86	78.35
Time in UK ≥ 1 yr, %	25.31	83.00					39.13	70.41
<i>Dependent variables</i> (time-varying)								
Physical Health (1-5)	3.81 (1.02)	3.99 (0.99)	3.85 (0.99)	3.86 (1.03)	3.84 (1.08)	3.91 (1.03)	4.01 (1.05)	3.75 (1.04)
Emotional Health (1-5)	3.22 (1.14)	3.51 (1.19)	3.38 (1.18)	3.51 (1.15)	3.50 (1.17)	3.49 (1.14)	3.72 (1.15)	3.42 (1.16)

*Note.* Independent variables used in these analyses were time-invariant; the averages in the table above for time=3 represent what was reported **at time=0** for **those who are still in the sample at time=3**. This is shown to compare the makeup of the sample at the beginning and end of data collection (to demonstrate the effect of attrition). Dependent variables, however, were measured at all four time points; the averages for each group at each time point are shown in the table. For health status variables, higher values indicate better health.

the ten most popular languages of refugees in the CID, including Somali and Arabic. Additional information about questionnaire development is available in the technical notes associated with the dataset (Cebulla, Daniel, Devine, & Tipping, 2010).

*Physical health status* was modeled as a continuous dependent variable that averaged values from two ordinal response questions. One question asked refugees to rate their health on a five-point scale from “very good” to “very bad.” The other asked respondents to rate how much their physical health has limited what they would normally do each day over the past month on a five-point scale from “not at all” to “could not do daily activities.” *Emotional health status* was modeled as a continuous dependent variable that averaged values from two additional ordinal response questions. One question asked refugees to rate how much they have been bothered by emotional problems in the past month on a scale from “not at all” to “extremely.” The other asked how emotional problems had limited what they would normally do each day over the past month on a five-point scale from “not at all” to “could not do daily activities.” Responses were reverse-coded from the original data to generate variables ranging from one to five, with higher values representing a more positive status (better health or less limitation).

Respondents indicated their *sex* as either male or female. The public-use dataset reported respondent age at baseline in categories. For analysis, these were collapsed to form a dichotomous variable, with one equaling an age of forty-five years or older at baseline; this cutoff was chosen because age is a risk factor for physical health problems, and there were few individuals in the higher age categories, so those above 45 represented the relatively “older” refugees in the study. The public-use dataset reported time in the UK prior to the asylum decision in categories. For analysis, these were collapsed to form a dichotomous variable, with one representing *one year or more in the UK* (zero representing less than one year). Respondents

indicated the *number of years of education* they had received prior to resettlement in the UK. For analysis, these were collapsed to form a dichotomous variable, with one representing seven or more years and zero representing fewer than seven years.

**Attrition.** Cross-sectional baseline weights were included in the public use dataset based on analysis of response from all countries (Home Office, 2010). These weights corrected for non-contact at baseline (questionnaires were sent to 85% of eligible respondents) and non-response at baseline (of those who were sent a questionnaire, 73% returned it) (Cebulla et al., 2010), and were included in all models. Those who did not respond at a given wave were not contacted at subsequent waves. Attrition was substantial for both groups, with less than 10% of the original Somali sample remaining at the final wave, and less than 20% of Iraqis remaining. Full information maximum likelihood estimation (FIML) used in model fitting assumed a missing-at-random mechanism that allows missingness on a dependent variable at time  $t$  to be related to observed values of independent variables or dependent variables at other time points, but not to the unobserved value of the dependent variable at time  $t$ . Simulations have shown that FIML is unbiased and more efficient than listwise deletion, pairwise deletion, and similar response pattern imputation in the SEM context (Enders & Bandalos, 2001). To explore patterns of missingness, logistic regression models were developed for the Iraqi and Somali subsamples that predicted dropout between baseline and first follow-up; a second series of models predicted dropout between baseline and the final wave. Major demographic characteristics (gender, age, education, living with partner, parental status, English ability), time in the UK before asylum decision, health status, and variables suggested by the UKNSR documentation to be associated with dropout across all nationalities (residence in housing provided by the National Asylum Support Service [NASS], region of residence) were included as predictors. All variables that

significantly predicted dropout were included in the conditional latent growth models (described shortly); however, those that were not of substantive interest to the analyses were included as auxiliary variables instead of predictor variables—NASS housing, partner, English ability.

### **Model-building**

All analyses used latent growth curve modeling (LGM) (Bollen & Curran, 2006) and were conducted using Mplus version 7.0 (Muthén & Muthén, 1998). Latent growth curve models are used to assess mean trajectories of change over time in repeatedly-measured constructs and are also used to assess individual variation around the mean trend. In all models, initial status (baseline wave) was coded as time=0 and subsequent time scores were coded proportional to the lengths of time between waves measured in years, which were unevenly spaced: time 1 = 0.67; time 2 = 1.25; time 3 = 1.75.

Each model was evaluated using likelihood ratio tests and overall model fit indices. RMSEA (Steiger & Lind, 1980) indicates population discrepancy per degree of freedom, and values of 0.05 or lower indicate close fit. TLI (Tucker & Lewis, 1973) and CFI (Bentler, 1990) compare fit with a baseline model, with values of 0.95 or above considered a good fit. Nested models were compared using likelihood ratio tests; also known as chi-square difference tests, the null hypothesis asserted no difference in fit between the two competing models. If the p-value for the test was less than 0.05, this indicated that there was a significant decrement in fit from the additional restriction(s) imposed by the nested model. Maximum likelihood estimation with robust standard errors in *Mplus* was employed in model fitting and this estimator is robust to non-normality; the standard errors are computed using a sandwich estimator, and its chi-square test statistic is asymptotically equivalent to the Yuan-Bentler T2\* test statistic (Muthén &

Muthén, 1998, 2005; Yuan & Bentler, 2000). Lastly, models were compared using BIC, a function of the likelihood of the fitted model, the number of estimated parameters, and the sample size; lower values indicate better fit (Schwarz, 1978).

A model building approach was taken, first with unconditional models (no predictors other than time), and then with conditional models that included time-invariant predictors (predictors that are either only measured once or do not change over time, such as sex) of the intercept and slope (also known as “growth factors”). Fit statistics for competing models were compared. Best fitting models for each outcome and nationality group were then combined to allow across-outcome and across-group comparisons. As this approach is exploratory in nature, replication of results in an independent sample is a necessary future objective.

**Health status trajectories over time.** In order to answer the first research question, in model building step one, the functional form over time (e.g., linear) and individual variation around the mean trend for each outcome (emotional v. physical health status) were determined for each group (Somali v. Iraqi) separately, using four univariate LGMs. Table 2.2 displays data that were used to assess model fit and the specific comparisons made in the model-building process described above. Quadratic and shape factor functional models were compared with linear models to determine the functional form. As part of this approach, models with occasion-specific residual variances (variance unexplained by the model that is specific to each time point) constrained to be equal across time were compared with models that allowed these variances to differ for each time point; the final model for each is bolded in the table. Because the LGMs for Iraqi emotional health and Somali emotional health tested parallel restrictions and yielded parallel results, (likewise for Iraqi physical health and Somali physical health), they are displayed in the same rows in Table 2.3; however the tests were conducted independently for the

Table 2.2

## Nested Model Comparisons for Four Unconditional Univariate Models

Model Comparison	More vs. less restrictive <sup>1</sup>	Iraqi Emotional					Somali Emotional				
		$\Delta$ TRd <sup>2</sup> (df)	$\Delta$ BIC <sup>3</sup>	CFI <sup>4</sup>	TLI <sup>4</sup>	RMSEA <sup>4</sup>	$\Delta$ TRd <sup>2</sup> (df)	$\Delta$ BIC <sup>3</sup>	CFI <sup>4</sup>	TLI <sup>4</sup>	RMSEA <sup>4</sup>
	Initial model (A1)	--	--	0.00	0.26	0.15	--	--	0.00	0.30	0.09
#1	(A1) vs. (B1)	$\Delta$ 180.72(1)***	- 102	0.94	0.97	0.03	$\Delta$ 68.80(1)***	- 64	1.00	1.03	0.00
#2	(B1) vs. (C1)	$\Delta$ 2.57(2)	+ 11	0.95	0.96	0.03	$\Delta$ 0.82(2)	+ 13	1.00	1.02	0.00
#3	(B1) vs. (D1)	$\Delta$ 8.08(3)	+ 12	0.99	0.99	0.02	$\Delta$ 2.55(3)	+ 18	1.00	1.03	0.00
#4	(B1) vs. (E1)	$\Delta$ 0.24(1)	+ 6	0.94	0.96	0.04	$\Delta$ 0.00(1)	+ 7	1.00	1.01	0.00
#5	(B1) vs. (F1)	$\Delta$ 12.50(4)*	+ 13	1.00	1.03	0.00	$\Delta$ 1.42(4)	+ 25	0.99	0.99	0.01
	<b>Final model (B1)</b>	<b>-1363.53</b>	<b>2752</b>	<b>0.94</b>	<b>0.97</b>	<b>0.03</b>	<b>-1663.87</b>	<b>3354</b>	<b>1.00</b>	<b>1.03</b>	<b>0.00</b>
Model Comparison	More vs. less restrictive <sup>1</sup>	Iraqi Physical					Somali Physical				
		$\Delta$ TRd <sup>2</sup> (df)	$\Delta$ BIC <sup>3</sup>	CFI <sup>4</sup>	TLI <sup>4</sup>	RMSEA <sup>4</sup>	$\Delta$ TRd <sup>2</sup> (df)	$\Delta$ BIC <sup>3</sup>	CFI <sup>4</sup>	TLI <sup>4</sup>	RMSEA <sup>4</sup>
	Initial model (A2)	--	--	0.00	0.26	0.15	--	--	0.00	0.32	0.14
#1	(A2) vs. (B2)	$\Delta$ 231.79(1)***	- 447	0.82	0.89	0.08	$\Delta$ 261.64(1)***	- 135	0.87	0.92	0.05
#2	(B2) vs. (C2)	$\Delta$ 16.36(2)**	- 2	0.90	0.93	0.06	$\Delta$ 18.42(2)**	- 2	0.97	0.97	0.03
#3	(C2) vs. (D2)	$\Delta$ 10.61(3)*	+ 7	0.95	0.94	0.06	$\Delta$ 9.73(3)*	+ 11	1.00	1.01	0.00
#4	(D2) vs. (E2)	$\Delta$ 0.02(1)	+ 6	0.94	0.92	0.07	$\Delta$ 0.36(1)	+ 7	1.00	1.00	0.00
#5	(D2) vs. (F2)	$\Delta$ 5.59(2)	+ 3	0.98	0.95	0.05	$\Delta$ 2.75(2)	+ 11	1.00	1.02	0.00
	<b>Final model (D2)</b>	<b>-1387.17</b>	<b>2412</b>	<b>0.95</b>	<b>0.94</b>	<b>0.06</b>	<b>-1523.21</b>	<b>3035</b>	<b>1.00</b>	<b>1.01</b>	<b>0.00</b>

Note. Each set of analyses (Iraqi emotional, Somali emotional, Iraqi physical, Somali physical) was conducted independently.

Model specifications series 1: (I = intercept growth factor, L = linear growth factor, Q = quadratic growth factor, S = shape factor).

Model A1 = I and L means estimated freely, I and L variances constrained to zero, I with L covariance constrained to zero, residual variances held equal across time

Model B1 = I and L means estimated freely, **I variance estimated freely**, L variance constrained to zero, I with L covariance constrained to zero, residual variances held equal across time

Model C1 = I and L means estimated freely, I and **L variances estimated freely, I with L covariance estimated freely**, residual variances held equal across time

Model D1 = I and L means estimated freely, I variance estimated freely, L variance constrained to zero, I with L covariance constrained to zero, **residual variances allowed to differ across time**

Model E1 = I and L means estimated freely, I variance estimated freely, L variance constrained to zero, I with L covariance constrained to zero, residual variances held equal across time, **Q mean estimated freely, Q variance constrained to zero, Q with L covariance and Q with I covariance constrained to zero**

Model F1 = I and **S means estimated freely, I and S variances estimated freely, I with S covariance estimated freely**, residual variances held equal across time

Model specifications series 2: (I = intercept growth factor, L = linear growth factor, Q = quadratic growth factor, S = shape factor)

Model A2 = I and L means estimated freely, I and L variances constrained to zero, I with L covariance constrained to zero, residual variances held equal across time

Model B2 = I and L means estimated freely, **I variance estimated freely**, L variance constrained to zero, I with L covariance constrained to zero, residual variances held equal across time

Model C2 = I and L means estimated freely, I and **L variances estimated freely, I with L covariance estimated freely**, residual variances held equal across time

Model D2 = I and L means estimated freely, I and L variances estimated freely, I with L covariance estimated freely, **residual variances allowed to differ across time**

Model E2 = I and L means estimated freely, I and L variances estimated freely, I with L covariance estimated freely, residual variances allowed to differ across time, **Q mean estimated freely, Q variance constrained to zero, Q with L covariance and Q with I covariance constrained to zero**

Model F2 = I and **S means estimated freely, I and S variances estimated freely, I with S covariance estimated freely**, residual variances allowed to differ across time

<sup>1</sup> The more restrictive model is supported if the test statistic difference is not significant.

<sup>2</sup> TRd = Satorra-Bentler scaled chi-square difference test statistic, comparing log-likelihood values between null and alternative models (Yuan & Bentler, 2000).

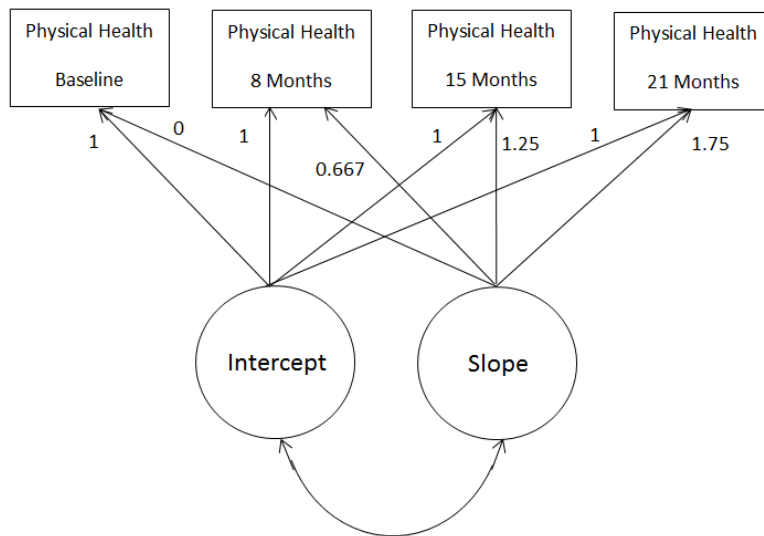
<sup>3</sup> More restrictive model is supported by a positive value.

<sup>4</sup> Refers only to the newly added model in the comparison being made.

\* p < .05 \*\* p < .01 \*\*\* p < .001.



four-model series. See Figure 2.1 for an example of a univariate linear LGM for physical health. Circles represent aspects of change (here, intercept and linear slope growth factors) and boxes represent observed repeated measures. Arrows represent regression paths which are fixed to the values specified. A curved arrow represents a covariance. Residual variances for repeated measures and variances for growth factors are not represented in the diagram.



*Figure 2.1.* Unconditional linear growth trajectory model for physical health over time. This model was fit separately for Somalis and Iraqis, and separately for physical and emotional health, to yield four simple unconditional models. Circles represent aspects of change (intercept and linear slope growth factors) and boxes represent observed repeated measures. Arrows represent regression paths which are fixed to the values specified. A curved arrow represents a covariance. Residual variances for repeated measures and variances for growth factors are not represented in the diagram.

**Relationship between emotional and physical health.** In order to address research question two, in model building step two, a multivariate model for each nationality group was constructed separately (Somali and Iraqi) by combining the best-fitting univariate models from the previous model building step. Initially, the means of growth factors were allowed to differ across process, but no growth factors were allowed to covary across process (growth factor covariances constrained to zero). Then the following models were tested in turn: (a)

unconstraining covariances for aspects of change (e.g., intercepts and slopes) across health process, (b) constraining the error covariances to be equal to each other within time across process, (c) constraining the mean intercepts and slopes to be equal across process. The models that were compared and the final model (bolded) are displayed in Table 2.3.

**Comparison of Iraqi and Somali trajectories.** To address research question three, the best-fitting multivariate growth curve models for each group from model building step two were combined into a *multigroup* multivariate growth curve model. This model was “multiple group” in the sense of allowing group-specific models for each nationality and was “multivariate” in the sense of including both physical and emotional health repeated measures. The initial model had no across-group constraints. Then the following were tested: (a) growth factor means for each process being equal across group (e.g., Iraqi emotional intercept mean = Somali emotional intercept mean), (b) growth factor variances and covariances within-process being equal across group (e.g., Iraqi emotional intercept variance = Somali emotional intercept variance), (c) within-time within-process residual variances and within-time across-process residual covariances to be equal across group (e.g., residual variance for time 0 for Somali emotional health = residual variance for time 0 for Iraqi emotional health). After each test, the best-fitting model was retained when moving to the subsequent comparison (see Table 2.4).

**Sociodemographic predictors of trajectories.** To address research question four, because it was of interest to know whether the predictors had the same effects on the growth factors for each nationality group, analysis returned to the best-fitting multivariate models for each nationality group. Then predictors (sex, age, education, time in UK before asylum decision) of both intercept and slope were added, and then the equivalence of the predictors' effects across nationality group was tested. Testing the equivalence of the effect of a predictor of intercepts

Table 2.3

*Nested Model Comparisons for Multivariate (Physical Health and Emotional Health) Models for Each Nationality Group Separately (unconditional)*

		Iraqi Multivariate				
Model Comparison	More vs. less restrictive <sup>1</sup>	$\Delta$ TRd <sup>2</sup> (df)	$\Delta$ BIC <sup>3</sup>	CFI <sup>4</sup>	TLI <sup>4</sup>	RMSEA <sup>4</sup>
	Initial model (A)	--	--	0.38	0.44	0.15
#1	(A) vs. (B)	$\Delta$ 100.44(1)***	- 223	0.74	0.76	0.10
#2	(B) vs. (C)	$\Delta$ 2.27(1)	+ 4	0.75	0.75	0.10
#3	(B) vs. (D)	$\Delta$ 94.96(1)***	- 126	0.96	0.96	0.04
#4	(D) vs. (E)	$\Delta$ 8.92(3)*	+ 6	0.97	0.97	0.04
#5	(F) vs. (E)	$\Delta$ 129.43(2)***	+ 105	0.76	0.76	0.10
	<b>Final model (E)</b>	<b>-2366.80</b>	<b>4824</b>	<b>0.97</b>	<b>0.97</b>	<b>0.04</b>
		Somali Multivariate				
Model Comparison	More vs. less restrictive <sup>1</sup>	$\Delta$ TRd <sup>2</sup> (df)	$\Delta$ BIC <sup>3</sup>	CFI <sup>4</sup>	TLI <sup>4</sup>	RMSEA <sup>4</sup>
	Initial model (A)	--	--	0.31	0.37	0.13
#1	(A) vs. (B)	$\Delta$ 120.33(1)***	- 262	0.75	0.77	0.08
#2	(B) vs. (C)	$\Delta$ 3.04(1)	+ 4	0.76	0.76	0.08
#3	(B) vs. (D)	$\Delta$ 104.89(1)***	- 130	0.99	0.99	0.01
#4	(D) vs. (E)	$\Delta$ 8.56(3)*	+ 12	1.00	1.00	0.00
#5	(F) vs. (E)	$\Delta$ 209.56(2)***	+212	0.61	0.61	0.10
	<b>Final model (E)</b>	<b>-2946.45</b>	<b>6012</b>	<b>1.00</b>	<b>1.00</b>	<b>0.00</b>

Note. Each set of analyses (Iraqi multivariate, Somali multivariate) was conducted independently.

Model specifications for Iraqi ethnic group: I = intercept growth factor, L = linear growth factor.

*Iraqi emotional final base model* = I and L means estimated freely, I variance estimated freely, L variance constrained to zero, I with L covariance constrained to zero, residual variances held equal across time

*Iraqi physical final base model* = I and L means estimated freely, I and L variances estimated freely, I with L covariance estimated freely, residual variances allowed to differ across time

*Model A* = final univariate base models; **all cross-process growth factor covariances constrained to zero**

*Model B* = final univariate base models; all cross-process growth factor covariances constrained to zero **except the emotional I with physical I cross-process covariance**

*Model C* = final univariate base models; all cross-process growth factor covariances constrained to zero except the emotional I with physical I cross-process covariance **and the emotional I with physical L cross-process covariance**

*Model D* = final univariate base models; all cross-process growth factor covariances constrained to zero except the emotional I with physical I cross-process covariance; **all within-time residual covariances constrained to be equal across process**

*Model E* = final univariate base models; all cross-process growth factor covariances constrained to zero except the emotional I with physical I cross-process covariance; **all within-time cross-process residual covariances allowed to differ**

*Model F* = final univariate base models; all cross-process growth factor covariances constrained to zero except the emotional I with physical I cross-process covariance; all within-time cross-process residual covariances allowed to differ; **across-process I constrained to be equal to each other, across process L constrained to be equal to each other**

Model specifications for Somali group: models were run and tested separately for each group, but the results for each group separately were identical, so refer to the specifications for Iraqi group.

<sup>1</sup> The more restrictive model is supported if the test statistic difference is not significant.

<sup>2</sup> TRd = Satorra-Bentler scaled chi-square difference test statistic, comparing log-likelihood values between null and alternative models (Yuan & Bentler, 2000).

<sup>3</sup> More restrictive model is supported by a positive value.

<sup>4</sup> Refers only to the newly added model in the comparison being made.

\* p < .05 \*\* p < .01 \*\*\* p < .001

across group amounts to testing a two-way interaction of the predictor with group. Testing the equivalence of a predictor of slopes across group amounts to testing a three-way interaction of the predictor, group, and time. Beginning with the best-fitting multivariate models for each nationality group and all four time-invariant covariates predicting all growth factors, across-group constraints were tested. Each of the predictor restrictions were added one-by-one, starting

Table 2.4

*Nested Model Comparisons for Multiple Nationality Group Multivariate (Emotional, Physical Processes) Models*

		Multigroup Multivariate (unconditional)				
Model Comparison	More vs. less restrictive <sup>1</sup>	$\Delta\text{TRd}^4$ (df) <sup>2</sup>	$\Delta\text{BIC}^3$	CFI <sup>5</sup>	TLI <sup>5</sup>	RMSEA <sup>5</sup>
	Initial model (A1)	--	--	0.99	0.99	0.02
#1	(B1) vs. (A1)	$\Delta$ 17.86(4)***	- 8	0.97	0.97	0.03
#2	(C1) vs. (A1)	$\Delta$ 8.45(5)	- 25	0.98	0.98	0.02
#3	(D1) vs. (C1)	$\Delta$ 2.23(5)	- 33	0.99	0.99	0.02
	<b>Final model (D1)</b>	<b>-5308.63</b>	<b>10803</b>	0.99	0.99	0.02
		Multigroup Multivariate (conditional)				
Model Comparison	More vs. less restrictive <sup>1</sup>	$\Delta\text{TRd}^4$ (df) <sup>2</sup>	$\Delta\text{BIC}^3$	CFI <sup>5</sup>	TLI <sup>5</sup>	RMSEA <sup>5</sup>
	Initial model (A2)	--	--	0.98	0.97	0.02
#1	(B2) vs. (A2)	$\Delta$ 4.38(4)	- 23	0.98	0.98	0.02
#2	(C2) vs. (A2)	$\Delta$ 11.69(8)	- 44	0.98	0.97	0.03
#3	(D2) vs. (A2)	$\Delta$ 17.77(12)	- 66	0.97	0.97	0.03
#4	(E2) vs. (A2)	$\Delta$ 19.56(16)	- 92	0.98	0.97	0.02
#5	(F2) vs. (E2)	$\Delta$ 4.08(4)	- 24	0.98	0.97	0.02
#6	(G2) vs. (F2)	$\Delta$ 11.13(5)	- 23	0.97	0.97	0.03
#7	(H2) vs. (G2)	$\Delta$ 3.04(9)	- 61	0.98	0.98	0.02
	<b>Final model (H2)</b>	<b>-9582.87</b>	<b>20242</b>	0.98	0.98	0.02

Note.

Model specifications for multiple group multivariate model (unconditional): *I* = intercept growth factor, *L* = linear growth factor

*Iraqi multivariate final base model* = final univariate base models linked across-process by constraining cross-process growth factor covariances to zero except the emotional *I* with physical *I* cross-process covariance and estimating all within-time cross-process residual covariances (allowing them to differ)

*Somali multivariate final base model* = same as above

*Model A1* = Combine both nationality groups' final multivariate base models with no restrictions across group

*Model B1* = Combine both nationality groups' final multivariate base models, **restricting the within-process across-group *I* means to be equal and *L* means to be equal** (e.g., Iraqi emotional *I* mean = Somali emotional *I* mean)

*Model C1* = Combine both nationality groups' final multivariate base models, **restricting the within-process across-group growth factor variances and covariances to be equal** (e.g., Iraqi emotional *I* variance = Somali emotional *I* variance)

*Model D1* = Combine both nationality groups' final multivariate base models, restricting the within-process across-group variances and covariances to be equal, **and the within-time within-process across-group residual variances and all within-time across-process across-group residual covariances to be equal** (e.g., residual variance for time 0 for Somali emotional health = residual variance for time 0 for Iraqi emotional health)

Model specifications for multiple group multivariate model (conditional): *I* = intercept growth factor, *L* = linear growth factor

*Model A2* = Combine both nationality groups' final multivariate base models with no restrictions across group, and with each of the four time-invariant covariates predicting all growth factors (but no restrictions among the growth factors)

*Model B2* = Combine both nationality groups' final multivariate base models with no restrictions across group, and with each of the four time-invariant covariates predicting all growth factors, **restrict effects of 'male' to be the same across-group** (e.g., effect of male on Somali emotional *I* = effect of male on Iraqi emotional *I*)

*Model C2* = same as B2, but enforce the restriction on '**age**' in addition to 'male'

*Model D2* = same as C2, but enforce the restriction on '**education**' in addition to 'age' and 'male'

*Model E2* = same as D2, but enforce the restriction on '**time in UK**'; in addition to 'education,' 'age,' and 'male'

*Model F2* = same as E2, but **restricting the within-process across-group *I* conditional means to be equal and *L* conditional means to be equal** (e.g., Iraqi emotional *I* mean = Somali emotional *I* mean)

*Model G2* = same as F2, but **all within-process across-group growth factor variances and growth factor covariances constrained to be equal** (e.g., Iraqi emotional *I* variance = Somali emotional *I* variance)

*Model H2* = same as G2, but **the within-time within-process across-group residual variances and all within-time across-process across-group residual covariances to be equal** (e.g., residual variance for time 0 for Somali emotional health = residual variance for time 0 for Iraqi emotional health)

<sup>1</sup> The more restrictive model is supported if the test statistic difference is not significant.

<sup>2</sup> TRd = Satorra-Bentler scaled chi-square difference test statistic, comparing log-likelihood values between null and alternative models (Yuan & Bentler, 2000).

<sup>3</sup> More restrictive model is supported by a positive value.

<sup>4</sup> Refers only to the newly added model in the comparison being made.

\*  $p < .05$  \*\*  $p < .01$  \*\*\*  $p < .001$ .

by restricting the effects of sex on all four growth factors (emotional intercept, emotional slope, physical intercept, physical slope) to be the same across group (e.g., effect of sex on Somali emotional intercept = effect of sex on Iraqi emotional intercept). For this series of restrictions, each new model was compared to the base model while retaining the previous restriction if it did not result in a decrement in model fit. After this series, all constraints were added in groups instead of one-by-one, and were compared to the best-fitting previous model (not the base model). These restrictions were the same as were done for the unconditional model in steps (a), (b), and (c) from the previous section. The lower half of Table 2.4 displays the models tested and measures of fit. Appendix A includes the *Mplus* input code for all models tested in the entire model-building series.

## Results

Descriptive results are followed by results of the latent growth curve modeling. Model results are organized by research question.

### Sample

Table 2.1 displays the sample size for each nationality group over all four waves and raw descriptive statistics for the sample (unadjusted for nonresponse or attrition). At baseline, the Iraqi sample was overwhelmingly male (86.0%), young (89.5% under 45), and the majority (83.0%) had been in the UK for a year or longer. In fact, almost half (49.6%) had been in the UK for five or more years prior to receiving a decision on their asylum claim. The majority (68.1%) had received seven or more years of education prior to arrival in the UK.

The Somali sample was also fairly young (83.0% under 45 years old). In contrast to Iraqis, however, Somalis had more females (43.9%), and consisted of many more recent arrivals. Only 25.3% had been in the UK for a year or longer, with more than half of the overall sample (50.9%) having been in the country for fewer than 6 months at the time of their asylum decision. In addition, fewer than one-quarter (24.9%) of Somali respondents had received seven or more years of education prior to their arrival in the UK.

The final column in Table 2.1 reports the sample characteristics for those who remained in the study at the last wave of data collection. The values reported for time-invariant predictors represent what each respondent reported at baseline, allowing us to assess how the makeup of the baseline and 21-month samples differ. Those who had received at least a basic education prior to arrival in the UK (seven or more years) made up a higher proportion of the 21 month sample than they did at baseline. For Somalis, those who had been in the UK longer at baseline tended to stay in the study at higher rates, while the opposite was true for Iraqis.

Each value for health status variables in Table 2.1 represents the raw (unweighted, unconditional) group mean on that variable reported at the indicated time point. At baseline, the average physical health score for Somalis was 3.81 and for Iraqis was 3.99; whereas the average emotional health score for Somalis was 3.22 and for Iraqis was 3.51. Figure 2.2 shows these values graphically. Although the averages for both physical and emotional health for Iraqis were higher than those for Somalis at baseline, the reverse was true by the final wave; average Somali health ratings increased over time, whereas Iraqi health ratings decreased. In addition, within-nationality group averages for emotional health were lower than for physical health for all time points. The statistical significance of the growth factors are reported in the section below.

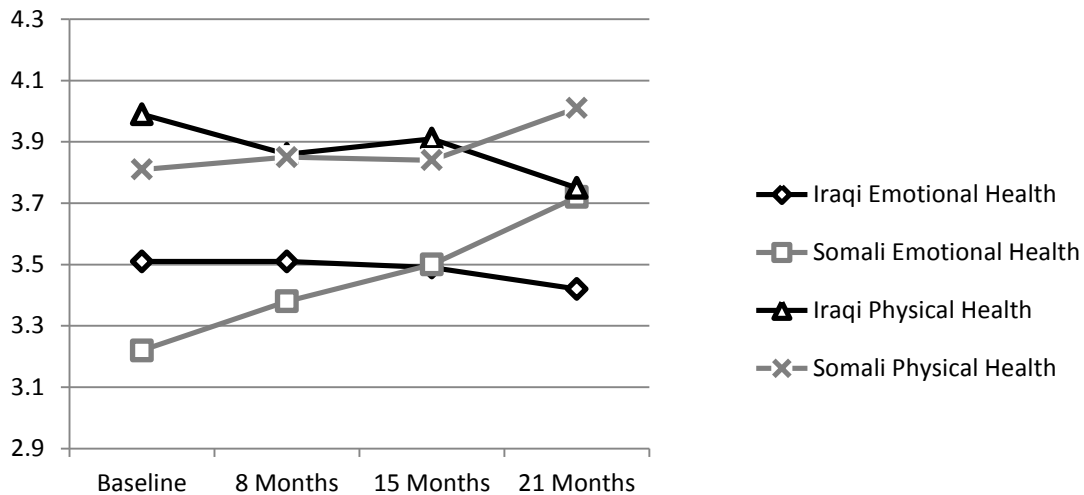


Figure 2.2. Self-rated emotional and physical health trajectories for Somalis and Iraqis over time. These are raw scores, unadjusted for nonresponse or attrition.

### Health Status Trajectories over Time

The first research question called for descriptions of the trajectories of health status over time. As described above, this yielded four separate models – a univariate model for each type of health (physical, emotional) for each group (Somali, Iraqi). The best-fitting unconditional model for Iraqi emotional health was a shape factor model with a freely-estimated intercept factor and shape factor. The “shape” factor allows for the parameters to indicate the curvature of the model without imposing a specific shape, as would be the case when fitting, for example, a quadratic model. The best-fitting unconditional model for Somali emotional health was linear in form, with randomly varying intercepts, fixed slopes, and residual variances set to be equal across all time points. The best-fitting unconditional models for Somali physical health and Iraqi physical health were also linear in form, with randomly varying intercepts. However, unlike those for emotional health, the best-fitting physical health models had randomly varying slopes and residual variances allowed to vary across time point. Fit statistics for the models tested and the final model (bolded) appear in Table 2.2. For all four univariate models, there was significant inter-

individual variability in the intercepts. For both Iraqi univariate models, the mean of the growth factor representing change over time (shape, linear slope) was not significantly different from zero; whereas, for both Somali univariate models, the linear slope was positive and significant. When modeled separately in this way, the results suggested that Somali health improved over time, but Iraqi health did not change. Although the shape factor model (F1) for Iraqi emotional health was, by some indicators of fit, a better model than the linear one, the linear form was retained in subsequent model-building steps because the other three best-fitting univariate models were all linear in form and later steps aimed to combine all four models.

### **Relationship between Emotional and Physical Health**

When the best fitting univariate physical and emotional process LGMs from step one were combined into a multivariate LGM, restrictions across process were tested for their effect on model fit. Iraqis and Somalis were tested separately, and the results of the model comparisons appear in Table 2.3. For both groups, the average intercepts and average slopes differed across process (could not be set as equal without a significant decrement in model fit), indicating that the growth trajectories for physical and emotional health are not identical. Also for both groups, the covariance between emotional and physical intercepts was significant and positive, indicating that higher initial emotional health was associated with higher initial physical health (and vice versa). Constraining this covariance to zero in the model resulted in a significant decrement in model fit, so it was freely estimated while the other three growth factor covariances across process were constrained to zero. The final model (bolded in Table 2.3) also allowed within-time point across-process residual covariances to be freely estimated.



## **Comparison of Iraqi and Somali Trajectories**

The multi-group multivariate LGM allowed testing of differences between nationality groups pertaining to the third research question. It combined the Iraqi and Somali multivariate LGMs from step two, with nationality as the grouping variable. The final model constrained within-process variances and covariances to be equal across nationality group; it also constrained within-process residual covariances to be equal across nationality group. The models tested and the criteria used in selecting the final model (bolded) are displayed in Table 2.4, and the results of the final model, without predictors other than time (unconditional), are shown on the left side of Table 2.5. The model fits the data very well, as indicated by RMSEA values below 0.05 and CFI and TLI values in excess of 0.95. A constraint that required the growth factor means to be equal across group was tested and rejected, indicating that the average initial ratings for both types of health are different for Iraqis and Somalis, and that the changes over time are also different for each group. Initial health status for both emotional and physical health was rated more highly by Iraqis than Somalis. The Iraqi slopes for both physical and emotional health were not significantly different from zero, indicating that there may be no trend in the change in the average health status over time, when averaged across all Iraqi respondents. However, the slopes for Somali respondents were significant and positive for both types of health status, indicating improvement over time.

## **Sociodemographic Predictors of Trajectories**

To determine whether or not basic sociodemographic predictors had equivalent effects across nationality group, a conditional version of the multigroup multivariate model was constructed, using sex, age, education, and time in the UK prior to the asylum decision as time-invariant covariates. The final conditional model is shown on the right side of Table 2.5. All

Table 2.5

*Multivariate Multigroup Model Results: Unconditional and Conditional*

	UNCONDITIONAL				CONDITIONAL			
	Iraqi (503) / Somali (752)				Iraqi (489) / Somali (702)			
	77.54 (62) .02 (.00, .03) .99, .99				149.85* (117) 0.02 (0.01, 0.03) .98, .98			
	Iraqi		Somali		Iraqi		Somali	
	P	E	P	E	P	E	P	E
<i>Growth Factor Means</i>								
Intercept	3.97***	3.50***	3.82***	3.24***	3.73***	3.04***	3.73***	3.04***
Slope	-0.05	0.06	0.15**	0.29***	0.08	0.36***	0.08	0.36***
<i>Growth Factor Variances</i>								
Intercept	0.53***	0.54***	0.53***	0.54***	0.46***	0.52***	0.46***	0.52***
Slope	0.09*	--0--	0.09*	--0--	0.09*	--0--	0.09*	--0--
<i>Growth Factor Covariances</i>								
Intercept – Slope	-0.02	--0--	-0.02	--0--	-0.06	--0--	-0.06	--0--
Intercept (E) – Intercept (P)	0.35***		0.35***		0.31***		0.31***	
Slope (E) – Slope (P)	--0--		--0--		--0--		--0--	
Intercept (E) – Slope (P)	--0--		--0--		--0--		--0--	
Intercept (P) – Slope (E)	--0--		--0--		--0--		--0--	
<i>Predictors of Intercept Factor</i>								
Male (ref female)					0.36***	0.32***	0.36***	0.32***
Age ≥ 45 yrs (ref < 45 yrs)					-0.74***	-0.24*	-0.74***	-0.24*
Education ≥ 7 yrs (ref < 7 yrs)					-0.04	-0.01	-0.04	-0.01
Time in UK ≥ 1 yr (ref < 1 yr)					0.06	0.24**	0.06	0.24**
<i>Predictors of Slope Factor</i>								
Male (ref female)					0.07	-0.129	0.07	-0.13
Age ≥ 45 yrs (ref < 45 yrs)					0.00	0.049	0.00	0.05
Education ≥ 7 yrs (ref < 7 yrs)					-0.03	-0.172	-0.03	-0.17
Time in UK ≥ 1 yr (ref < 1 yr)					-0.14	-0.025	-0.14	-0.03
<i>Residual Error Variances</i>								
Baseline (t=0)	0.51***	0.81***	0.53***	0.81***	0.48***	0.79***	0.48***	0.79***
8 Months (t=1)	0.39***	0.81***	0.41***	0.81***	0.42***	0.79***	0.42***	0.79***
15 Months (t=2)	0.30***	0.81***	0.32***	0.81***	0.31***	0.79***	0.31***	0.79***
21 Months (t=3)	0.33***	0.81***	0.31***	0.81***	0.33***	0.79***	0.33***	0.79***
<i>Residual Error Covariances (P with E)</i>								
Baseline (t=0)	0.36***		0.36***		0.35***		0.35***	
8 Months (t=1)	0.26***		0.26***		0.26***		0.26***	
15 Months (t=2)	0.19***		0.19***		0.19***		0.19***	
21 Months (t=3)	0.39***		0.39***		0.40***		0.40***	

Note. Blank cells indicate that the item was excluded from the model; a single “-0-” means that the parameter was constrained to zero in the model. E = emotional health status, P = physical health status.

\*p < .05; \*\*p < .01; \*\*\*p < .001.

across-group constraints failed to result in a decrement in model fit, and so were retained. The first series of tests restricted the effects of each of the predictors to be the same across-group (e.g., the effect of male sex on Somali emotional health intercept = the effect of male sex on Iraqi emotional health intercept); including such restrictions on all four predictors did not result in a significant decrement in model fit compared to a baseline model with no restrictions across group on predictors' effects ( $\Delta TRd=19.56$ ,  $df=16$ ,  $p > 0.05$ ). Males were more likely to report higher initial health status for both types of health, and being in the older age category was associated with rating initial health lower for both types. Having some education prior to arrival in the UK did not have a significant relationship to either type of health status. Having lived in the UK for a year or more prior to the asylum decision was unrelated to physical health status, but was significantly related to higher emotional health status. None of the sociodemographic variables predicted the rate of change in physical health or emotional health for either group.

The next series of restrictions did not result in a significant decrement in fit, and were therefore retained. These included the following, in sequence: constraining the within-process conditional means (residual means) for intercepts and slopes to be equal across group ( $\Delta TRd=4.08$ ,  $df=4$ ,  $p > 0.05$ ); constraining all within-process growth factor variances and growth factor covariances to be equal across group ( $\Delta TRd=11.13$ ,  $df=5$ ,  $p > 0.05$ ); and constraining the within-time within-process residual variances and within-time across-process residual covariances to be equal across group ( $\Delta TRd=3.04$ ,  $df=9$ ,  $p > 0.05$ ). Thus, once the sociodemographic predictors had been added to the model, all aspects of the models for the two groups were able to be set as equal, including the residual intercept mean and residual slope mean. For example, the value of the Iraqi physical intercept mean in the conditional model indicates that the average score for Iraqi women under 45, with fewer than seven years of

schooling, and who had been in the UK for less than one year prior to asylum decision, was 3.73, and that the value for Somalis (meeting the same conditions on the predictors) was the same.

## **Discussion**

Resettled refugees represent a vulnerable population with potentially serious health needs. Few studies have examined refugee health status over time, and even fewer have considered differences between nationality groups or in multiple different types of health status. This study used longitudinal data collected from refugees living in the United Kingdom over four time points that spanned a total of 21 months after receiving a positive decision on an asylum claim. Exploratory analyses considered the initial health status and change over time for two groups of refugees – Iraqis and Somalis – in self-rated emotional and physical health. A multigroup multivariate latent growth curve model with sociodemographic predictors of initial status and rate of change fit the data very well and can help us to understand more about changes in health status for resettled refugees.

First, self-rated health status shortly after being granted asylum, and changes in health status over the following 21 months were described with models that considered each nationality group and each type of health separately. For this first series, no predictors were included; the interest was only in describing the nature of the trajectories over time, and this resulted in four simple models: Iraqi emotional health, Somali emotional health, Iraqi physical health, Iraqi emotional health. Results indicated that initial physical health status was rated higher than initial emotional health status for both nationality groups; and initial health status for Iraqis was higher than initial health status for Somalis (for both types of health). However, ratings of Iraqis' health status over time remained fairly constant (slopes were not significantly different from zero),

while Somalis' self-ratings of both types of health increased over time. Due to these patterns, nearly two years after being granted asylum, Somali self-ratings of health were higher than those of Iraqis. There are a number of potential explanations for this. Physical health status may have been rated higher than emotional status for both groups because refugees are likely to experience stressors that could contribute more to emotional problems than to physical ones. The high rates of attrition may have biased the samples who responded in later waves. In addition, these models do not include predictors of the trajectories; characteristics that differentiate the nationality groups and are relevant to health status are included in later models to account for this possibility. Models that included sociodemographic predictors are described below.

The second research question sought to understand differences between the two types of health status (physical and emotional) over time by comparing their trajectories (i.e., testing model constraints across the trajectories). Models were constructed separately for each nationality group, but the results were the same for both groups. Initial emotional health status covaried significantly with initial physical health status, suggesting that higher initial emotional health is related to higher initial physical health for both Iraqis and Somalis. This is not surprising, given that ratings of physical and emotional health are often related, and this has been observed across various cultures (Pressman et al., 2013).

Next, the models from the previous step were combined in order to compare health status trajectories for Iraqis against Somalis. The average initial health ratings differed across nationality group, as did the change in health status over time, with Iraqis initially enjoying better health than Somalis for both types of health, but being surpassed by Somali health ratings by the fourth wave (21 months after asylum decision). Whereas group differences were found in the means of the growth factors (intercepts and slopes), no group differences were found in the

variances and covariances across group. In summary, unconditional models indicated that the trajectory for emotional health is not identical to the trajectory for physical health within a nationality group; rather the way that one's emotional and physical health statuses change over time are not identical, and represent different processes. In addition, unconditional models indicated that Somali and Iraqi groups' health trajectories were not identical to each other for either kind of health.

Interesting patterns emerged when sociodemographic predictors were added to the models. Above, it was reported that the intercept and slope means in unconditional models were different for Iraqis and Somalis. However, after including sociodemographic predictors in the model, the growth factor means could be constrained as equal without a significant decrement in model fit. This implies that the differences between Somali and Iraqi mean intercepts and slopes may have been due to differences between these groups on their sociodemographic makeup.

The relationships between each sociodemographic predictor and health status were the same for both nationality groups. Female sex and older age were risk factors for lower initial health status (both emotional and physical), whereas having lived in the UK for at least one year before baseline was associated with higher initial rating of emotional health. That age is a risk factor for lower health is not surprising. We do not know what mediates the relationship between sex and health status, but it is likely that other risk factors are involved, such as exposure to stressors, or it could reflect a higher willingness to report health problems. The length of time that one has lived in the UK prior to the asylum decision likely has a complex relationship with health status that operates through one or more mediators, but it is difficult to speculate what the mechanisms might be. Time in the UK may act as a proxy for the amount of time that has passed since being exposed to traumatic experiences or the fear that caused one to flee one's country as

a refugee, especially since this variable significantly predicted only emotional health status (and not physical). This was one of the variables by which the Iraqi and Somali samples differed greatly, with half of the Iraqi sample having lived in the UK for at least five years before the study's baseline, and only 25% of the Somalis having lived in the UK for even one year. Because of this, the period of time covered by these data represent a different phase of resettlement for the two groups. If health status changes more rapidly immediately after resettlement, then this could explain why, in unconditional models, Somali health appeared to improve over time and Iraqi health did not. In addition, the Iraqi group had a much higher percentage of males (86.0%) than the Somali group (56.1%), so adjusting the trajectories for gender, which was a significant predictor of initial health (both types), may have contributed to evening them across groups.

Despite some significant effects for the predictors' relationships with health status at the time of asylum decision, none were associated with change in health rating over time (slopes). It is highly likely that there are other baseline predictors omitted from the model that would have helped to explain slopes. It is also possible that baseline characteristics are much less relevant than contemporary characteristics; in other words, time-varying covariates may have been more effective in explaining change in health status over time, as potentially relevant characteristics, like education level and socioeconomic status, may vary over the course of the study period.

## **Limitations**

There were several limitations to this study. Mail surveys have a number of inherent limitations (Babbie, 2001) but the UKNSR was designed and implemented quite well despite these issues. One potential concern was the ability of the respondents to fill out the survey accurately. Although the data do not report the language of the questionnaire, and no information

about literacy in the respondent's native language is available from the questionnaire, respondents were asked whether or not they received assistance completing the questionnaire. A surprisingly low 35.2% of baseline Somalis marked this box, and 30.2% of Iraqis.

Some key predictors of interest were not available in the dataset or were not measured adequately. For example, variables from other components of the IFH, such as risk (e.g., exposure to trauma) and protective factors (e.g., social support), could have helped to explain variation in health status trajectories. Even the social characteristics that were used in this study were only available in categorized form (which were then dichotomized to contribute to model parsimony); however, it would have been ideal to have them available in continuous form (such as the continuous number of years since entering the UK or the continuous number of years of education). Although the dataset did include potential predictors from multiple waves that could have served as time-varying covariates, including them in the model resulted in nonconvergence; this is potentially due to the severe attrition across the study period that resulted in low sample sizes at the later waves. Additionally, because the questionnaire was meant to be brief and simple (such that it could be successful in the form of a mail survey), sophisticated measures of key predictors were unavailable. Lastly, establishing the baseline at the time at which the asylum decision was made had both advantages and disadvantages. Receiving official refugee status would have given the respondent access to public goods and services; however, their experiences in the UK prior to this event were also likely of great importance, and were unmeasured.

## **Conclusion and Implications**

This series of analyses has contributed to knowledge on refugee health status over time, but was highly exploratory. The results presented here are too tentative to warrant



recommendations for policy or practice, but should certainly encourage future research into these topics. This study implies that it is important to consider both physical and emotional health, for they represent distinct processes, and that patterns in health status can vary across groups, although such variation may be explained by differences in social characteristics or other factors. Women, older individuals, and newer arrivals might be particularly at risk. Groups of refugees for whom these risk factors tend to be very prevalent may need to be given special attention by resettlement entities to ease their transitions. None of the predictors used in these analyses were able to predict change in health over time, but explaining why, for example, the Somalis in this study reported (average) increases in health during the first two years after receiving asylum while Iraqis did not, would be an important contribution. It is also important that these results be confirmed by other studies.

In addition, ideal data for such analyses would involve a longitudinal design with high retention rates across all waves and multiple ethnic or nationality groups in large numbers. The data would include time-varying covariates that (a) span the various components of the IFH, including social characteristics, risks and protective factors, and psychosocial resources (b) address multiple ecological levels including the neighborhood and community, and (c) are measured reliably and with cross-cultural validity. Having a continuous indicator for time in relation to other key events (such as entry to the UK) could allow for testing alternate time points for initial status. Creating data with these characteristics would require vast resources given the challenges of tracking refugees over time and implementing a study in multiple languages. However, such work could contribute greatly to our knowledge about refugee health and adjustment, as well as our ability to serve their needs adequately.

## CHAPTER III

### STRESSORS AND HEALTH: SOMALI REFUGEES IN A SOUTHEASTERN CITY

#### **Introduction**

Millions of refugees worldwide have fled their homes and resettled elsewhere, either temporarily or permanently, to escape violence, persecution, or other serious dangers (United Nations High Commissioner for Refugees, 2012). Refugees may experience trauma prior to, during, and after flight, as well as more chronic stressors while living in countries of asylum or resettlement. Numerous studies have now shown that exposure to stressors has a strong link with health status across a range of both physical and emotional illnesses. Therefore, refugees are potentially at an increased risk for health problems due to their past and current experiences. The US admits tens of thousands of refugees each year from around the world, and information about their health status is needed to inform policy and practice. This study investigates exposure to stressors, health status, and the relationship between the two among a group of Somali refugees living in Nashville, TN.

Somalia has generated the third highest number of refugees in the world (UNHCR, 2012), estimated at over one million. In 1991 the government of Said Barre, which had been in power for over two decades, collapsed and spurred a civil war that has continued ever since (United States Central Intelligence Agency, 2013). The Tennessee Office for Refugees reports that close to 17,000 refugees have been resettled to the state since 1996, and that nearly 3,000 of these were of Somali origin. The majority of refugees in Tennessee are assigned to Davidson

County (metro Nashville area), however, large numbers are also directed to Memphis, Knoxville, and Chattanooga (Tennessee Office for Refugees, 2013b). Although records are not available for the time period prior to 1996, the five years between the beginning of the Somali civil war and 1996 likely saw additional refugees resettled to the area.

The health status of resettled refugees has been studied in a number of industrialized countries. For example, a study of Somali refugees living in the UK found that over 30% had a common mental disorder and that 14% had PTSD (Bhui et al., 2006). Health studies of Somali refugees often measure traumatic experiences and these rates can be quite high. A study in Canada found that 79% of Somali respondents had experienced at least one traumatic event (Jorden et al., 2009), and a study of Somali and Oromo refugees in Minnesota found that the prevalence of having experienced torture was 44% overall. Often, experiences of trauma directly predict morbidity for certain types of health problems. In the UK, researchers found that each traumatic event experienced before resettlement was related to an increase in anxiety and depression risk among Somalis (Bhui et al., 2003). In another study, a count of traumatic experiences and experience of torture predicted social, physical, and psychological problems (Jaranson et al., 2004). A study of refugees from three countries (including Somalia) resettled to the Netherlands found that having experienced more traumatic events increased risk for several health measures, and that stressors experienced while living in the host country also increased risk for PTSD, and symptoms of anxiety and depression (Gerritsen et al., 2006).

Although studies of populations exposed to armed conflict often focus on the relationship between traumatic experiences and distress or ill health, some researchers argue that chronic stressors are as, if not more, relevant to the understanding of health status (Miller & Rasmussen, 2010b). In the US, new immigrants and refugees may have difficulty getting adequate jobs,

have difficulty communicating, and lack high-quality housing, among other problems (Garrett, 2006). Chronic exposure to such stressors can induce hormone responses that affect the brain and mental health (Lupien, McEwen, Gunnar, & Heim, 2009). In studies of refugees, these types of stressors are sometimes referred to as “postmigration living difficulties” (Silove et al., 1997). In a study of Burmese refugees in Australia, for example, such stressors made independent contributions to health status (Schweitzer et al., 2011). Ultimately, it is important to consider multiple types of exposure to stressors in order to understand the health needs of refugees and provide effective services to this population.

### **Theoretical Background**

The “stress process model” (Pearlin, Menaghan, Lieberman, & Mullan, 1981) is one of several similar theoretical explanations of health status that appeal to psychosocial factors, suggesting that structural arrangements affect both the stressors to which individuals are exposed and the resources that they are able to access to deal with stressors. Such models often include social characteristic variables like race and socioeconomic position as well as psychological traits (e.g., self-esteem) and social resources (e.g., social support). They also favor assessment of an array of health conditions as potential “outcomes,” since the health impact of social structures is not limited to any one illness (Aneshensel, 2005). Alternative models in social epidemiology include (a) those about the social production of disease, focusing on the structural determinants of health – the root or “upstream” causes, such as the organization of societal systems; and (b) ecological models, attending to the contexts surrounding an individual at multiple levels (e.g., family, community), including both proximal and distal factors as well as influences from multiple sectors (Nancy Krieger, 2001). The Integrated Framework for Health (IFH) (Lunn,

2014b) integrates elements from all of these theories to help assess relevant contributors to health status for any given population, and can be applied to refugees to generate dozens of variables that have either already been studied or should be considered among these groups. Variables are categorized as social characteristics, risks and protective factors, or psychosocial resources, and span the individual, family, neighborhood, community, and macro-levels. Stressors are specifically categorized in the “risks and protective factors” component of the IFH, as exposure to stressors is considered a risk factor for illness. As noted above, researchers have distinguished between multiple different types of stressors, including those of a traumatic event-like nature and those of a chronic day-to-day nature. The IFH also treats these separately, predicting that they could have differential relevance for current health status. Elements within other components of the model, such as self-esteem (a psychological resource) have been shown to contribute independently to health status among other populations, and may also have relationships with exposure to stressors that should be investigated in future studies.

This study investigated selected variables from the IFH to understand their relative contributions to health status for Somalis living in Nashville bearing on the following:

1. What are the most prevalent stressors reported by Somali refugees living in Nashville?
2. Do Somali refugees show the same patterns of relationships between stressors and health status that have been shown in broader populations? Specifically,
  - a. Is being a member of a disadvantaged social group (sex, age, education) associated with higher exposure to stressors?
  - b. Is higher exposure to stressors associated with poorer health status, and are certain types of stressors more salient to health status than others?

- c. To what extent does exposure to stressors mediate the relationship between disadvantaged social status and poorer health status?
3. How are different types of health status (physical, emotional) related to each other in this population?

### **Methods**

The Nashville Refugee Health Survey was designed as a first step in investigating the characteristics of refugees from Somalia and Iraq living in Nashville, TN, with the intent of understanding the health needs of these groups and informing future studies of local refugee populations. This paper is limited to discussion of data from Somali respondents (n=145). The project represented a collaboration between a local non-profit organization that serves immigrants and refugees (the Center for Refugees and Immigrants of Tennessee [CRIT]), and a private university. The project was funded by a very modest grant, so resources in data collection were limited. The research team included representatives from the university and the non-profit; in addition, opinions from refugees in the area were solicited and incorporated during project design, data collection, and data analysis. The survey went through several stages of development as the research team adjusted question wording and shortened the instrument to reduce the burden on respondents. Improvements were made in response to cognitive interviews with refugee respondents, feedback from translators, and feedback from respondents during the first stage of data collection. The English version of the survey (Appendix B) was translated to Somali and then back-translated to check for equal meaning (Brislin, 1970). All components were approved by the Vanderbilt University Institutional Review Board.

## **Sample**

Refugees represent a population that are very difficult to sample because in most cases there is no sampling frame or list from which to draw respondents randomly (Bloch, 1999). Although local resettlement agencies may have initial contact information for their clients, refugees are often mobile within town. In addition, common “secondary migration” (migrating to a different city within the US after having been officially resettled) limits the utility of initial contact information. Refugees and service providers suggested a combination of recruitment at Somali community locations, snowball sampling, and door-to-door solicitation in neighborhoods with high Somali residence (more detail in following section).

## **Data Collection**

About one-fourth of the sample was recruited at an office building that houses numerous Somali businesses as well a coffee shop that caters specifically to Somali customers. On data collection days, the research team distributed flyers throughout the building and respondents came to the surveying location on the first floor at their convenience during the work day. Another one-fourth of the sample were recruited directly through CRIT (either their staff or friends) and during a community event held at the center. Approximately one-fourth of respondents were surveyed in their homes in a large apartment complex known to house many Somalis; research pairs composed of a data collector and a community member / interpreter. In many cases, residents either knew the community member working with the research team or had been contacted ahead of time by someone in their social network who had already participated. In other cases, after completing the survey, the resident(s) of one home would recommend another home in the area with someone who might be willing to respond to the

survey. The remainder of the sample was recruited in other locations or via other organizations, including two local mosques attended by Somalis, three additional neighborhoods housing Somalis, one other business frequented by Somalis, and an ESL class. These methods together yielded a total of 145 eligible respondents, whose characteristics are reported in Table 3.1. Unfortunately there are no estimates of the demographic characteristics of the local Somali population; however, recent (2007-2013) data from a local resettlement agency (Tennessee Office for Refugees, 2013a) indicated that the Somali refugees in their resettlement database have similar age (average = 31.9, standard deviation = 10.8) and gender (female = 47.5%) makeup as our sample population.

The survey was administered in paper-and-pencil form. Those who were literate in either English or Somali completed the survey at their own pace and returned it to the research team when finished. However, literacy rates among Somalis are very low, estimated at less than 50% for males and just over 25% for females (US CIA, 2013). Therefore, a great many of the respondents required one-on-one assistance from an interpreter in survey completion.

## **Measures**

Three dependent variables, each representing a form of health status, were explored with these analyses. First, respondents were asked to rate their *health in general* on a five-point scale from “excellent” (=5) to “poor” (=1). This variable was recoded to form a dichotomous indicator of worse self-rated health: “fair” or “poor” (=1) (in contrast to “good,” “very good,” or “excellent” (=0)). Such global self-rated health measures are widely used in national surveys and have been validated across several cultural groups (Chandola & Jenkinson, 2000; Idler & Benyamini, 1997).



Table 3.1  
*Descriptive Statistics and Definitions for All Variables (pre-imputation)*

Variable	Description	N	Mean or Percent	SD	Range of Values
<b>Social and Demographic Characteristics</b>					
Female	Sex	142	47.18%	--	0 / 1
Unemployed	Not currently working for pay and looking for a job	139	17.99%	--	0 / 1
High school	Has high school diploma or equivalent	143	48.25%	--	0 / 1
English ability	Speaks English well or very well (vs. not well or not at all)	142	54.93%	--	0 / 1
Marital status	Never married (vs. married, separated, divorced, widowed)	144	40.28%	--	0 / 1
Age	Current age in years	127	34.65	12.34	18 – 64 years
Time in US	Amount of time living in the US (years)	138	7.89	5.31	1 – 31 years
<b>Exposure to Stressors</b>					
Chronic stressors	“Do you agree?” Average of 10 items (see items in Table 3.2)	132	0.48	0.39	0 = Not true 1 = Somewhat true 2 = Very true
Traumatic stressors	“Have these ever happened to you or someone you know?” Average of 10 items (see items in Table 3.2)	132	0.26	0.37	0 = Never happened 1 = Saw it happen to someone else 2 = Happened to me
<b>Health Status</b>					
Low self-rated health	“In general, would you say your health is: excellent, very good, good, fair, or poor?” Responses dichotomized: “fair” or “poor” = 1; all others = 0.	136	15.44%	--	0 / 1
High physical limitation	“Does your health prevent you from doing the following?” Average of 4 items: vigorous activities, moderate activities, climbing several flights of stairs, walking several blocks. Dichotomized such that values of 1.0 or above = 1, and values below 1.0 = 0.	129	27.91%	--	0 / 1
High emotional symptoms	“In the past week, have these things happened to you?” Average of 22 items, e.g., feeling fearful, crying easily, poor appetite, feeling lonely. Dichotomized such that values of 1.25 or above = 1, and values below 1.25 = 0.	131	29.77%	--	0 / 1

*Note.* Health status variables are all coded dichotomously such that problematic status = 1 (low self-rated health, high physical limitation, high emotional symptoms).

*Physical health limitations* were measured using four items drawn from the SF-36, originally created by RAND Corporation for the Medical Outcomes Study (McHorney, Ware, Lu, & Sherbourne, 1994) that asked about limitation in activities with a range of effort level. For example, “Does your health prevent you from doing vigorous activities (running, lifting heavy objects, participating in strenuous sports)?” Response options were rated on a three-point Likert scale such that higher scores represent more limitation (not difficult=0; somewhat difficult=1; very difficult=2). Responses to each item were averaged for a total score ( $\alpha = 0.96$ ); due to the irregular distribution of average scores, each respondent’s value was dichotomized using a cutoff of 1.0 that was derived from a natural break in the sample distribution of the variable and also substantively represented “somewhat difficult” in response to a limitation item; the resulting variable represents a contrast between relatively more physical limitation (=1) and less physical limitation (=0).

Lastly, *emotional symptoms* were measured using an amended version of the Hopkins Symptom Checklist-25 (Richard F. Mollica, McDonald, Massagli, & Silove, 2004). In initial discussions with community members and during pilot testing, three items from the original 25-item checklist were deemed either inappropriate or difficult to understand among this population; these items were deleted to yield a version with just 22 items. For each item, respondents were asked to indicate how much (on a four-point scale from “not at all” (=1) to “extremely” (=4)) they experienced each feeling in the past week. Examples include “feeling restless” and “feeling low in energy.” This instrument was designed specifically for use with refugee populations by the Harvard Program in Refugee Trauma (HPRT) and was adapted for use with Somali refugees by the Vanderbilt-CRIT research team. The items are meant to measure emotional health, primarily corresponding to the Westernized conceptions of anxiety and depression. Responses

were averaged for a total score ( $\alpha = 0.91$ ). HPRT recommends a cutoff value of 1.75; however, preliminary analyses (not shown) indicated that few respondents fell into this category and that the variables of importance to this study offered little explanatory value in regression models. Therefore, a lower cutoff value of 1.25 was used; those whose average score across the items exceeded this value were classified as having “high” generalized emotional symptoms (=1) in contrast to low symptoms (=0).

Three social characteristics and two types of stressors were also measured. Respondents reported their *sex* as either male or female, and their *age* in years. Respondents indicated their highest *level of education* from among five categories, and these were collapsed to form a variable representing having completed high school or received a GED (=1) versus not having completed high school (=0).

*Chronic stressors* were measured with a 10-item index generated for the study; items were submitted and evaluated by the research team and Somali informants with the purpose of capturing everyday types of stressors that are commonly experienced in this population. Example items included “there is always too much to do,” and “you have been separated from a key family member.” Respondents could indicate that the item is not true (=0), somewhat true (=1) or very true (=2). Averaging scores over all items provided a total chronic stressors score ( $\alpha = 0.77$ ). Experiences of *trauma* over the lifetime were measured with a modified version of the Life Events Checklist (Blake et al., 1995; Gray, Litz, Hsu, & Lombardo, 2004). Our measure reduced the number of items from 17 to ten by combining related items and eliminating the option to include “any other stressful event or experience.” Example items include “combat or exposure to a war-zone” and “severe human suffering.” We also reduced the number of response options from five to three: the event ever happened directly to the respondent (=2), he or she ever

witnessed the event happen to someone else (=1), or neither (=0). Averaging these scores over the ten items created a total trauma score ( $\alpha = 0.87$ ).

If a respondent answered fewer than half of the items in a given scale, then his/her responses were recoded to missing for the entire scale (n=4 for physical limitations; n=4 for emotional symptoms; n=2 for chronic stressors ; n=0 for trauma).

## **Analysis**

Descriptive statistics were compiled for each item in the inventories for chronic and traumatic stressors to reveal the relative frequency with which each was endorsed. Bivariate correlations were also produced for each pair of study variables. To understand the more complex relationships between social characteristics, stressors, and health, several analyses were undertaken. In addition to testing hypotheses in their own right, the series collectively tested whether or not exposure to stressors mediated the relationship between social characteristics and health status, using the criteria established by Baron and Kenny (1986). First, the hypothesized mediators (exposure to two types of stressors) were regressed on the independent variable set (social characteristics—gender, age, education). Because the distributions of the average trauma and chronic stressors scores were both highly skewed, the variables were square-root transformed for analyses in which they served as the dependent variables. Then, a series of logistic regressions were performed for each of the three health status variables. The first model in each series regressed the dependent variable on social characteristics; the next regressed the dependent variable on the hypothesized mediators; the third combined all variables for a full model. Because it was also of interest to look at whether or not different types of health were related to each other, the final set of analyses were as follows: for dependent variables that

represented “physical” health (low self-rated health and physical limitations), the emotional health symptoms were added to the model; and when emotional health was used as a dependent variable, physical limitations were added to the final model.

Missingness on independent model variables ranged from 1.4% (education) to 12.4% (age). When combined for a given regression, casewise deletion methods reduced the number of cases available for analysis by over 30% in some cases. The nature of the missingness in our data is MAR (missing at random) because missingness is related to other variables in the dataset, but is unlikely to be caused by the value of the variable itself. Multiple imputation via chained equations simulates sets of values to replace those that are missing based on regression equations specified by the researcher. When analyses are conducted on these many resultant datasets, parameters are pooled to account for this data structure (White, Royston, & Wood, 2011). The imputation model employed here included all variables (both independent and dependent) that were to be used in the substantive analyses, those that predicted missingness in the target variables, and those that explained substantial amounts of variance in the target variables (van Buuren, Boshuizen, & Knook, 1999). Although dependent variables were included in the imputation model, when regression models were run post-imputation, imputed values of the dependent variable were dropped (Von Hippel, 2007). The analyses were performed in Stata version 12.0 (StataCorp, 2011).

## **Results**

Table 3.1 displays the descriptive statistics for the sample as well as variable definitions. The average age of survey respondents was 34.7 years and 47.2% were female. Approximately half (48.3%) had a high school diploma or equivalent. The average length of time spent in the

US was almost 8 years (7.9), but ranged from only 1 year to more than 30. Slightly more than half (54.9%) of the sample reported that they speak English well or very well. The average score for chronic stressors was 0.48, with most of the sample (90.9%) reporting the experience of at least one chronic stressor. The average trauma score was 0.26, with 54.6% of respondents reporting at least some trauma (either witnessing or experiencing).

Overall, Somalis reported high positive health status, with only 15.4% reporting poor or fair health. Using a value of 1.0 to dichotomize the symptom average, 27.9% reported limitations to physical activity above the cutoff. Using a lenient cutoff value for emotional symptoms (1.25), 29.8% of respondents fell into the category called “high” symptoms. Nearly 10% of those who had valid values for each of the three types of health assessed (n=123), fell into the problematic category for all three (low self-rated health, high emotional symptoms, high physical limitation). Of the 22 emotional symptoms listed, five had been experienced in the past week by more than 20% of respondents: headaches (33.8%), low in energy or slowed down (25.4%), no interest in things (22.2%), difficulty with sleep (21.7%), worrying too much (20.6%). The five least endorsed symptoms were: loss of sexual interest or pleasure (4.7%), feelings of being caught or trapped (7.0%), feeling hopeless about the future (7.6%), feelings of worthlessness (7.7%), and crying easily (8.5%). Over 25% of respondents endorsed each of the physical limitations items, and more than one-third of respondents (34.9%) said that vigorous activities are at least somewhat difficult for them.

### **Common Stressors for Somalis in Nashville**

The first research question inquired about the most common stressors experienced by Somalis living in Nashville. Respondents reported financial difficulties most frequently from the

list of chronic stressors available in the survey, with nearly 80% saying that this was at least somewhat true and over 40% saying very true. Other common chronic stressors included having too much to do and feeling too much expectation from others. In addition, more than 15% indicated that there was a very troubling separation from a key family member. "Interpersonal conflict" and "restricted daily freedom" were reported least frequently. The traumatic stressors with the highest average reported value were "serious accident" and "assault" (full results reported in Table 3.2).

### **Patterns of Health Status**

The second research question refers to patterns of health status for Somalis in Nashville. Bivariate correlations between each of the continuous study variables are reported in Table 3.3. For variables that were dichotomized for later regression analysis, the original continuous versions of the variables are used in correlation analysis; this includes the health status variables, exposure to stressors, and education level (five categories with higher values representing higher educational achievement). These give a general sense of risk factors for poor health and relationships between other study variables. Of note is that those with more education tended to report more stressors (both chronic and traumatic), but fewer physical limitations. In addition, chronic and traumatic stressors were significantly correlated with each other. All three measures of health were correlated with each other; the correlation between lower self-rated health and physical limitations was much higher than that of either one with emotional symptoms. Both types of stressors were significantly correlated with emotional symptoms but not with physical limitations or lower self-rated health.

Table 3.2  
*Descriptive Results for Each Stressor*

<b>Chronic Stressors (current, %)</b>			
	Not True	Somewhat True	Very True
Financial difficulties	21.09	36.72	42.19
Too much to do	50.00	30.77	19.23
Others expect too much of you	55.39	28.46	16.15
Family separation	72.44	11.81	15.75
Friend/family unhappy	73.64	20.93	5.43
Communication difficulty	73.85	17.69	8.46
Friend/family unhealthy	75.97	15.50	8.53
Troubling immigration status	75.97	13.18	10.85
Daily freedom restricted	82.68	11.81	5.51
Interpersonal conflict	83.08	13.08	3.85

<b>Traumatic Stressors (lifetime, %)</b>			
	Never	Saw Happen	Happened to Me
Serious accident	63.64	17.42	18.94
Assault	71.97	18.18	9.85
Sudden death	76.52	20.46	3.03
Natural disaster or other disaster	78.03	15.91	6.06
Life-threatening illness/injury	81.82	12.88	5.30
Combat or war-zone	82.58	9.09	8.33
Severe human suffering	84.09	12.12	3.79
Sexual assault	88.64	7.58	3.79
Captivity	89.31	7.63	3.05
Exposure to toxin	92.42	5.30	2.27

*Note.* Stressors are ordered from most frequently mentioned to least.

Table 3.3  
*Bivariate Correlations Between Model Variables*

	Age	Education	Chronic Stressors	Traumatic Stressors	Physical Limitations	Low Self-Rated Health	Emotional Symptoms
Age	--						
Education	-.16	--					
Chronic Stressors	-.11	.26*	--				
Traumatic Stressors	.11	.31*	.19*	--			
Physical Limitations	.16	-.23*	-.01	.13	--		
Low Self-Rated Health	.35*	-.13	.01	.14	.53*	--	
Emotional Symptoms	.07	.09	.21*	.42*	.35*	.37*	--

*Note.* All health status variables are coded such that higher values represent problematic health status (higher physical limitation, lower self-rated health, and higher emotional symptoms). All variables in this table were used in their original continuous or multi-category form prior to dichotomization.

\*  $p < .05$



**Social characteristics and stressors.** The second research question, pertaining to the relationship between social characteristics, stressors, and health status, had three parts. Part A concerned social characteristics and stressors. Table 3.4 reports results of traumatic and chronic stressors regressed on gender, age, and education. The model predicting chronic stressors was not statistically significant, in contrast with the model predicting traumatic stressors. Having a high school education was associated with higher average scores for traumatic stressors, controlling for age and gender.

Table 3.4  
*Multiple Regression Results for Social Characteristics on Stressors (imputed)*

Variable	Chronic Stressors (n=132)			Traumatic Stressors (n=132)		
	Coef.	SE	P	Coef.	SE	P
Female	-0.01	0.06	.93	-0.06	0.07	.35
Age	0.00	0.00	.56	0.01	0.00	.10
High School	0.14	0.06	.02	0.26	0.07	<.001
(cons)	0.60	0.10	<.001	0.09	0.11	.41
Model F (p)	2.33 (.08)			8.03 (<.001)		
R <sup>2</sup>	.05			.14 - .17		

*Note.* Stressors were modeled continuously, but were square-root transformed after imputation to account for skewed distributions. R<sup>2</sup> values were not available for combined imputed analyses; the values provided represent the range of r<sup>2</sup> values when the logistic regression is performed on each of the 20 imputation datasets individually.

**Understanding health status.** To answer parts B and C of the second research question, analyses tested the relationship between stressors and health status, and the potential mediation of the relationship between social characteristics and health status by exposure to stressors. Results are organized by the type of health status that was used as the dependent variable in each series of analyses.

**Self-rated health.** Table 3.5 displays results of the logistic regression with low self-rated health as the dependent variable. In models 1-3, only age had a significant relationship with this

measure when social characteristics and stressors were included. In model 4, having high emotional symptoms (vs. not high) was also associated with low self-rated health. In fact, for those in the high emotional symptoms group, the odds of having low self-rated health were more than 13 times higher than the odds for those in the lower emotional symptoms group. A pooled measure of model fit was not available for imputed logistic regression analysis, but the range of pseudo-R<sup>2</sup> values for each of the 20 imputation datasets is reported at the bottom of Table 3.5. These values indicated that social characteristics and emotional symptoms help to explain low self-rated health, but stressors contribute little to the model.

***Physical limitations.*** A similar progression of analyses was performed with high physical limitation as the dependent variable (see Table 3.6). When all social characteristics and stressors were modeled together, older age, female sex, having lower education, and experiencing more trauma were all associated with high physical limitation. However, when emotional health status was added in model 4, it rendered all other variables insignificant except for age. Being in the high emotional symptoms group made it more likely that the respondent would be in the high physical limitation group, controlling for exposure to stressors and social characteristics. Pseudo-R<sup>2</sup> values for the final model ranged from .17 to .22.

***Emotional symptoms.*** When only social characteristics were considered, none of those selected for analyses were significant predictors of high emotional symptoms. However, in model 2, exposure to both traumatic and chronic stressors were associated with more risk of being the high emotional symptoms group, and pseudo-R<sup>2</sup> values ranged from .18 - .24 in contrast with .02 - .03 when social characteristics were modeled alone (see Table 3.7). In model 3, an increase of one unit in the traumatic experiences score made a respondent more than 37 times as likely to be classified as having high emotional symptoms. Note that although this value

Table 3.5

*Logistic Regression Results for Low Self-Rated Health (N=136)*

	Model 1			Model 2			Model 3			Model 4		
	OR	SE	P	OR	SE	P	OR	SE	P	OR	SE	P
<b>Social Characteristics</b>												
Female	1.56	0.96	.47				1.56	0.94	.46	1.58	1.18	.54
Age	1.07	0.02	<.01				1.07	0.02	<.01	1.07	0.03	<.01
High school	0.53	0.34	.32				0.53	0.34	.33	0.72	0.55	.67
<b>Stress Exposure</b>												
Chronic Stressors				0.53	0.36	.35	0.87	0.59	.84	0.34	0.28	.19
Traumatic Stressors				1.28	0.76	.68	1.14	0.83	.86	0.28	0.22	.11
<b>Health Status</b>												
Emotional Symptoms										13.37	9.26	<.001
_cons	0.01	0.01	<.001	0.23	0.09	<.001	0.01	0.01	<.001	0.01	0.01	<.001
Model F (p)	3.41 (.02)			0.45 (.64)			2.39 (.04)			4.81 (<.001)		
Pseudo-R <sup>2</sup>	.14 - .16			.01			.13 - .16			.23 - .32		

*Note.* Pseudo-R<sup>2</sup> values were not available for combined imputed analyses; the values provided represent the range of pseudo-r<sup>2</sup> values when the logistic regression is performed on each of the 20 imputation datasets individually.

Table 3.6

*Logistic Regression Results for High Physical Limitations (N=129)*

	Model 1			Model 2			Model 3			Model 4		
	OR	SE	P	OR	SE	P	OR	SE	P	OR	SE	P
<b>Social Characteristics</b>												
Female	2.32	1.13	.08				2.83	1.39	.03	2.64	1.33	.06
Age	1.05	0.02	.02				1.04	0.02	.04	1.04	0.02	.05
High school	0.55	0.26	.21				0.33	0.18	.04	0.35	0.20	.07
<b>Stress Exposure</b>												
Chronic Stressors				0.93	0.53	.90	1.54	1.05	.53	1.08	0.76	.92
Traumatic Stressors				2.63	1.26	.04	5.20	3.12	.01	2.73	1.74	.12
<b>Health Status</b>												
Emotional Symptoms										3.09	1.66	.04
_cons	0.06	0.06	<.01	0.30	0.11	<.01	0.04	0.04	<.01	0.04	0.04	<.01
Model F (p)	4.07 (.01)			2.13 (.12)			4.12 (<.01)			3.67 (<.01)		
Pseudo-R <sup>2</sup>	.09 - .12			.02 - .04			.14 - .20			.17 - .22		

*Note.* Pseudo-R<sup>2</sup> values were not available for combined imputed analyses; the values provided represent the range of pseudo-r<sup>2</sup> values when the logistic regression is performed on each of the 20 imputation datasets individually.

is quite high, an increase of 1.0 on the scale could only be achieved by a huge difference in exposure; for example, 1.0 is the difference between endorsing none of the events at all, and having witnessed every event on the list. Lastly, those with high physical limitations had an odds of having high emotional symptoms that was more than three times that of those without physical limitations (model 4).

## **Discussion**

Overall, Somalis in Nashville reported high exposure to chronic stressors and moderate exposure to traumatic stressors, but rated their health status fairly highly. Exposure to stressors had varying relationships with health status depending on the type of status measured (e.g., physical limitation), but different types of health were strong predictors of each other in all cases.

### **Stressors**

Financial concerns are clearly a major issue among Somali refugees, with nearly 80% reporting this on the list of chronic stressors in the survey. A lower, but still substantial, number of people reported troubling separations from key family members. These are not uncommon in previously published studies; for example, a study of Somalis living in Seattle found that family separation and poverty were the most frequently cited difficulties from their list of post-migration problems (Bentley, Thoburn, Stewart, & Boynton, 2012). The present results also showed that two forms of pressure ranked highly on the list – always having too much to do, and others expecting too much – indeed, these chronic stressors came up often in discussions held with Somalis from the same community (Lunn, 2014c). Although each of the stressors on the list

Table 3.7

*Logistic Regression Results for High Emotional Symptoms (N=131)*

	Model 1			Model 2			Model 3			Model 4		
	OR	SE	P	OR	SE	P	OR	SE	P	OR	SE	P
<b>Social Characteristics</b>												
Female	1.60	0.68	.27				2.64	1.41	.07	2.12	1.14	.17
Age	1.03	0.02	.13				1.03	0.02	.18	1.02	0.02	.41
High school	1.76	0.75	.18				0.76	0.37	.57	0.90	0.48	.84
<b>Stress Exposure</b>												
Chronic Stressors				3.65	2.29	.04	4.81	3.31	.02	4.57	3.06	.02
Traumatic Stressors				20.56	14.00	<.001	37.68	31.90	<.001	36.70	32.97	<.001
<b>Health Status</b>												
Physical Limitations										3.37	1.70	.02
_cons	0.11	0.08	<.001	0.09	0.04	<.001	0.02	0.02	<.001	0.02	0.02	<.01
Model F (p)	1.30 (.27)			11.82 (<.001)			4.60 (<.001)			4.92 (<.001)		
Pseudo-R <sup>2</sup>	.02 - .03			.18 - .24			.22 - .28			.26 - .32		

*Note.* Pseudo-R<sup>2</sup> values were not available for combined imputed analyses; the values provided represent the range of pseudo-r<sup>2</sup> values when the logistic regression is performed on each of the 20 imputation datasets individually.

was endorsed by at least 16% of the respondents, some were clearly more prevalent than others.

Nearly 60% reported seeing or experiencing at least one of the traumatic events on the list, but this means that over 40% reported none. Other studies with Somalis have reported wide ranges of traumatic exposure; for example, Bentley (2012) reported a rate of 43.2% in Seattle Somalis. However, given the current conditions in the country and the turmoil that has lasted for more than two decades, these rates of exposure seem low and could indicate underreporting bias. For example, even with trained mental health professionals in a clinical setting, Kroll (2011) reported that Somali patients were very reluctant to admit or discuss traumatic experiences.

When stressors were regressed on social characteristics, only education emerged as a significant predictor such that those with a high school degree (or equivalent) were more likely to report higher exposure to trauma. In our sample, education was very highly related to English ability, such that almost none of those without a high school education reported being able to speak English well or very well. Further investigation is needed to understand this association, but it may be attributable to the willingness to report trauma instead of a causal association that implicates education as a risk factor for experiencing trauma. Furthermore, because this study is cross-sectional and we did not ask when the traumatic events were experienced in relation to age or education, we cannot assume education or older age preceded the experiences of trauma. Indeed, many traumatic experiences likely occurred prior to resettlement in the US, and we do not know when or where the respondents were educated.

## **Health Status**

Overall, Somalis reported high general health (almost 85% self-rated their health as good, very good, or excellent) and moderate emotional symptoms (almost 38% reporting that they

experienced none of the 22 symptoms at any level at all in the past week, but some symptoms were endorsed by more than 20% of respondents). A meta-analysis and review of studies of refugees across numerous countries of origin (Steel et al., 2009) reported extremely high variation in the prevalence of depression (3% - 85.5%). Although our study does not attempt to classify respondents into categories that correspond to diagnosis of mental illness, the measure we used for emotional symptoms is often used for this purpose among refugee groups. The high rates of healthiness for Somalis that we found would have been surprising, given the many risk factors that refugees endure; however, other studies that focused specifically on Somalis have also reported curiously high health status. For example, in a study of adults enrolled in public health programs in Minnesota, whites, U.S.-born blacks, and Somalis were compared. Somalis rated their health much better than either of the other two groups, with high general self-rated health and low depressive symptoms (Henning-Smith, Shippee, McAlpine, Hardeman, & Farah, 2013). This study also included a one-item stigma measure that asked respondents if they would (hypothetically) be embarrassed about seeing a mental health professional. Almost one quarter of Somalis chose “very embarrassed” - a rate that was more than twice that of whites in the study and about five times that of U.S.-born blacks. Qualitative studies with Somali refugees have found that Somalis may conceive of health status differently from Westerners such that only very severe illnesses would be considered health problems (Elmi, 1999; Lunn, 2014c; Warfa et al., 2006) and that mental illness carries a costly stigma (Henning-Smith et al., 2013). It is therefore possible that health problems, especially those of an emotional nature, are underreported among this population.

In full models that explored the relationships between social characteristics, stressors, and health status, some trends were apparent. Age was a risk factor for low self-rated health and for



physical limitations, but not for high emotional symptoms. Assuming that respondents were accurately reporting their symptoms (this assumption is questionable, see limitations and Lunn, 2014c), this suggested that physical health worsens with age, but that older Somalis are no more likely than younger Somalis to experience emotional issues. The opposite was true for exposure to traumatic stressors—higher exposure was not related to low self-rated health or to physical limitation, but had a strong relationship with emotional symptoms. Not knowing when the exposure to traumatic stressors occurred relative to the current time period or the current age is problematic if it is the case that emotional symptoms are worse with more recent exposure. A similar trend was seen with chronic stressors and different types of health, with the relationship being significant only for emotional symptoms and not for low self-rated health or physical limitations. Like previous studies, these analyses have shown that both chronic and traumatic stressors have strong associations with emotional health status. One caution is that, as noted before, the scale of stressors ranges only from zero to two, so an increase of one unit is a very substantial increase in exposure.

These analyses did not provide evidence that exposure to stressors mediated the relationship between social characteristics and health status. Age was the only social characteristic that was a significant predictor of any of the health status outcomes, and its effects were not even partially explained by the addition of stressors to the models, nor was exposure to either type of stressor significantly related to age.

The relationships between types of health were as expected. Controlling for social characteristics and stressors, physical health status was significantly related to emotional health status. Distress can weaken the physical body, and having physical ailments can cause distress.

In addition, another recent study of resettled Somali refugees also found that better physical health predicted better mental health in controlled analyses (Henning-Smith et al., 2013).

### **Study Limitations**

This was a small study with a difficult-to-research population and limited funding. Language and wording differences across regions of Somalia made survey item wording difficult to understand for some respondents, but this was mitigated by the extensive use of interpreters in data collection. The two main interpreters on this project were both young Somali males, and it is possible that females or other respondents were less than fully comfortable reporting truthful information about their experiences and health status, although all study participants did provide informed consent to participate. Because exposure to stressors was measured with checklist inventories, the problems associated with such measures are worth noting (Cohen, Kessler, & Gordon, 1997), especially the potential omission of important experiences from the lists. Although we offered interpreter assistance and reduced the questionnaire length as much as possible, the burden remained high and respondent fatigue may have been an issue. Especially with the longer inventories, it is possible that participants selected the null set of responses without considering each question individually in an effort to complete the questionnaire more quickly. In addition, as discussed above, cultural norms and/or stigma may have contributed to a reluctance to report certain types of symptoms (emotional), traumatic experiences, or even anything negative at all (lower health, experience of stressors) .

Various other components of the IFH are worth exploring in this population, but were unavailable in these data. Information about socioeconomic status beyond education level proved unreliable and difficult to obtain. Scales measuring self-esteem, locus of control, and social

support had very low internal consistency (Cronbach, 1951), and given other concerns about data quality for these measures, they were excluded from this study. In addition, multicollinearity among potentially important predictors prevented us from including all in the model. Lastly, despite the theoretical importance of community-level and macro-level constructs in health status, these data did not include characteristics beyond the individual level.

### **Conclusions and Implications**

This study represents a contribution to both the refugee health literature and the understanding of the stress process in diverse populations. In addition, having local knowledge about Somali-Nashvillians is useful to service providers who can use the data to understand health needs and service design. However, much more work should be done to explore the complex factors that contribute to health status. For example, more research is needed regarding the relationship between social characteristics and exposure to stressors. In this study, having a high school education was associated with reporting higher exposure to traumatic stressors. It is possible that higher education makes it more likely that a person will report traumatic experiences (as opposed to making it more likely that s/he will experience them), but why this would be the case is unknown.

It is also important in studies of health and stress to consider multiple measures of health and different types of symptoms. The three different health measures utilized here demonstrate that the characteristics and experiences contributing to health status may differ depending on the nature of the health problem measured; this has been noted time and again in the stress process literature, sometimes referred to as “misclassification bias” (Turner, 2010). In addition, it is

important to consider the effect that each type of health might have on another (e.g., the toll it takes on one's physical health to be experiencing high emotional burdens, and vice versa).

Taken collectively, these results suggest several main points. Somali refugees in Nashville (in addition to other areas that have been studied) face substantial current exposure to chronic stressors and past exposure to traumatic stressors. Experience of each of these stressor types independently contributes to a higher probability of having high emotional symptoms. Another important finding was that using a lower cutoff for the HSCL than recommended by the literature was helpful. This could be due to potential underreporting of symptoms, especially those of an emotional nature. The variables included in this study were unable to helpfully account for differences between those with high and low emotional symptoms using the recommended cutoff in this sample (1.75), but were much more useful when a lower cutoff (1.25) was used. Among cultures that highly stigmatize mental illness, or in research studies that lack the opportunity for in-depth conversation and probing about emotional issues, lower rates of reported symptoms are understandable.

Although refugees are a very difficult population to access, the partners involved in this study went to great pains to reach those who were most vulnerable – door-to-door canvassing to reach women and individuals who do not use community services, interpreters to assist those who do not speak English or were not functionally literate in either Somali or English, and diverse data collection sites (from homes to mosques to community centers) and diverse data collection days and times in order to make the opportunity to participate available and convenient for those who have demanding schedules or responsibilities elsewhere. The study was conducted in close collaboration by research team members from both a university and a refugee-serving non-profit organization, and refugee informants were consulted through the

study design, instrument development, data collection, and data interpretation phases. Multiple imputation was used to mitigate the effects of missing data, and multiple types of stressors as well as multiple types of health status were evaluated. A strong sample size was obtained and key expected relationships were shown with these data. As should be obvious, conducting research with this population was extremely challenging and resource-intensive, and still suffered major limitations (cannot explore causality because of the cross-sectional nature of the data, missing key variables representing components of the IFH because of unreliability or lack of validated scales for this population, etc.). Research with refugee groups is important given their growing numbers and multiple risk factors for illness, but such research is also exceedingly difficult, and absolutely requires strong community connections and buy-in, as well cross-sector teams and strong commitment. Future studies should use these collaborative community-based methods to focus in on key issues of importance to refugee health and explore factors at levels beyond the individual (social factors, community context, etc.) that could be relevant to refugee health.

## CHAPTER IV

### UNDERSTANDING ADJUSTMENT:

#### THE HEALTH STATUS OF SOMALI REFUGEES IN A SOUTHERN US CITY

##### **Introduction**

The Office of the United Nations High Commissioner for Refugees (UNHCR) reports concern for more than ten million refugees worldwide (2012). A small but significant proportion of refugees are permanently resettled to industrialized countries, but life may continue to be challenging after resettlement. Resettled refugees living in the US represent a group of people with several potential risk factors for illness. One of the less explored areas among resettled refugees is the role of acculturation in health status. This study utilized both quantitative and qualitative data from a group of Somali refugees living in Nashville, TN to understand the concepts of health and acculturation, as well as the relationship between them.

The UNHCR defines a refugee as one who “owing to a well-founded fear of being persecuted for reasons of race, religion, nationality, membership of a particular social group or political opinion, is outside the country of his nationality, and is unable to, or owing to such fear, is unwilling to avail himself of the protection of that country,” (UNHCR, 2012, p. 2). Somalia has been embroiled in a civil war for over 20 years, and continues to generate high numbers of refugees. Refugees may experience severe hardships prior to, during, and after flight. Some stay in refugee camps; others settle in third countries in the region. In some cases, refugees seek permanent resettlement in a host country. The US admits tens of thousands of refugees each year

from around the world, including many from Somalia. Although this may represent a positive alternative for many, these individuals and families face new hardships once resettled.

The health of resettled refugees is important for a number of reasons. The countries of resettlement have agreed to take on these individuals as permanent residents, and therefore have a stake in their health. Because many have experienced traumatic events and because these events tend to be linked with health problems (Jaranson et al., 2004; Jorden et al., 2009) , refugees represent a population with exceptional risk factors for ill health. Study of the patterns and correlates of health status among refugees provides information about conditions of life in the US that are related to disease among this group of international migrants and can be used to inform community-level services, interventions, and health care delivery.

Definitions of acculturation vary, but most refer to the process that occurs as a cultural group (or member of a cultural group) encounters another cultural group or individual. This paper will take a multidimensional approach loosely following Schwartz and colleagues (2010). As such, this paper defines acculturation as the personal negotiation of practices, values, and identifications associated with both one's country of origin and resettlement that proceeds for each person as he or she adapts to a new cultural environment. Studies suggest that greater acculturation toward a host culture is a risk factor for certain health issues and protective against others (Abraído-Lanza, Armbrister, Flórez, & Aguirre, 2006; Koneru et al., 2007). Studies linking acculturation and health, however, often use proxy measures for acculturation, such as time spent in the US and English ability, that are not conceptually equivalent to the complex negotiation of practices, values, and identifications. Furthermore, as many scholars have argued, acculturation should not be thought of as a unilinear continuum with the culture of origin on one end and the culture of resettlement on the other (Sam & Berry, 2010; Todorova et al., 2013);

acquisition of the characteristics of a new culture does not necessarily imply the loss of characteristics of the traditional culture, if even such clear-cut cultural characteristics were to exist. Multi-item acculturation scales have been developed that can be useful for measuring variables such as behaviors (e.g., how often do you eat the food of your native country?) but have difficulty capturing other key aspects of acculturation (e.g., endorsement of American v. Somali values). Numerous such scales have been developed in the hopes of capturing such intricacies, but there are difficulties with this approach. For example, each scale must be adapted for and validated in the specific cultural group that is being measured, which is very resource-intensive. In addition, such scales can be lengthy and difficult to use in short questionnaires. At the time of this study's design, a review of the published literature did not reveal a published Somali-specific acculturation scale. Furthermore, acculturation itself is a highly contested construct, and critiques have documented weaknesses in the concept, its measurement, and its application in health studies. For example, a recent review notes problems with the use of proxy measures like language ability, the failure to recognize ecological context (e.g., different family members acculturating at different rates), and questionable construct validity to scales (Lopez-Class, Castro, & Ramirez, 2011). Despite the weaknesses, however, it continues to be studied in health research, and could be of use, especially if improvements were made in light of criticisms.

This study explored the concept of acculturation using both qualitative and quantitative methods. Data were collected from Somali refugees living in Nashville, TN in partnership with a local non-profit organization that provides services to immigrants and refugees in the area. This group was chosen because Somalis have been settling in Nashville for many years, and this represents a community that non-profit organizations wanted to know more about in order to inform service delivery. The Tennessee Office for Refugees reports that nearly 3,000 Somali



refugees have been officially resettled to the state since 1996, the majority in Davidson County (Nashville Metro area) (Tennessee Office for Refugees, 2013b). In addition to those who were “officially” resettled to Nashville, secondary migration – migration to other areas within the US after resettlement – may have brought other Somalis to the area. As explained above, what can be learned from proxy variables, like time spent in the US, may be limited. This is shown by comparing what was learned about acculturation’s relationship to health status using a quantitative survey, with what was learned from qualitative focus group data.

### **Theoretical Background**

Traditional medical models of health focus on the identification and treatment of illness. More recent models look at social factors and sometimes highly complex causal chains that increase risk for or protection against, illness. These “social determinants of health” include characteristics related to how societal resources are distributed and the (dis)advantages to which people are exposed. They are now commonly used to explain disparities in physical and mental health status; for example, in the United States and many other countries, socioeconomic position (SEP), race and ethnicity, and gender are individual characteristics that consistently put people at differential risk for illness and death (Braveman, Egerter, & Williams, 2011b).

The Integrated Framework for Health (IFH) (Lunn, 2014b) combines elements from several different social epidemiological theories (Krieger, 2001) which help assess relevant contributors to health status. In Lunn (2014b) the IFH was applied to refugees to generate dozens of variables that have been studied or should be considered. Variables are categorized as social characteristics, risks and protective factors, or psychosocial resources, and span the individual-, family-, neighborhood-, community-, and macro-levels. The qualitative data used in this analysis

touch on many different elements of the IFH, but here the focus is specifically on acculturation and issues directly related to it. The quantitative comparison data are limited by (a) the variables available in the dataset and (b) the small sample size. These data include primarily individual-level variables; thus, the influences from other ecological levels cannot be evaluated. One task of this paper is to approach an understanding of the role of acculturation relative to other variables in the process that results in health status. The following research questions are pursued:

1. How do Somalis resettled to Nashville understand the process of acculturation and adjustment to life in the America? Specifically, what changes occur in values, identities, and behaviors? Why and under what circumstances do these changes occur?
2. In what ways and under what circumstances might acculturation or adjustment relate to health status?
3. What is the relationship between quantitative proxy measures of acculturation and health status among Somali refugees? What is the relationship between what is gleaned from the proxies and what is gleaned from the qualitative data?

## **Methods**

This study uses mixed methods in the form of small focus groups (n=12 across 4 groups) and a written survey (n=145) taken by Somali refugees living in Nashville, TN. All components were approved by the Vanderbilt University Institutional Review Board.

### **Focus Groups**

The focus group portion of this study aimed to explore the rich and potentially diverse understandings of complex topics. The methodology allowed for each participant to conceive of

and express his or her reality. Data from these participants cannot be generalized to all Somalis or even to Somalis living in Nashville, but in describing the viewpoints of these participants, a deeper understanding of these topics, and perspective on the range of experiences, attitudes, and beliefs, that lay within these broader populations can be gained.

**Sample.** Focus group participants were selected purposively based on their knowledge of the local Somali community. All participants were of Somali origin, and some had been key players in the planning or recruitment phases for the survey portion of the project. Others were recruited through contacts at a local community organization. An attempt was made to include individuals from varying socioeconomic status, gender, age, length of time in the US, and area of residence in Nashville so that as many perspectives as possible would be represented. Four small focus groups were held (n=12 participants in total). Five of the 12 participants were female; age ranged from 21 to 57; some respondents were employed in professional occupations (e.g., interpreter, caseworker) and others in lay occupations (e.g., factory worker); time in the US ranged from less than one year to 27 years. The sample was limited to participants with either advanced or fluent English-speaking ability. Men's and women's focus groups were held separately upon recommendation from community members to create an atmosphere in which participants felt comfortable talking about gender-specific issues. The focus groups were facilitated by the research team leader, a U.S.-born Caucasian female experienced in focus group facilitation and with a background in data collection and community-based work with Somali refugees. For two of the four focus groups, another research team member (U.S.-born Caucasian female) co-facilitated the sessions; her experience working at a community agency that provides services to resettled refugees provided valuable direction.

**Discussion guide.** Sessions began with general introductions and instructions. The groups first discussed their conceptions of “health.” After initial responses, the facilitator prompted the group about differences between physical and emotional health. The facilitator loosely followed a discussion guide (Appendix C), which also specifically addressed questions from the survey and how participants might interpret survey results. In addition, participants were asked to comment about their experiences as they adjust to life in the US or changes that happen to behaviors, identity, values, and health over time spent in the US. In some cases, participants were asked about their own personal experiences; in other cases participants were asked to provide their perceptions of all Somalis, in general.

**Analysis.** Session recordings were transcribed verbatim. The core research team consisted of three individuals; two worked primarily in academic research settings and the other was in a management position at a human services organization that focuses on refugee clients. Although all team members were American-born, two of the coders had extensive experience in the Somali community during the study design and survey data collection phases, and were present at one or more focus group sessions and thus familiar with the tones and contexts in which the discussions took place. The other research team member provided a more distanced perspective, which was helpful for that reason. Initially, the coders reviewed the transcripts independently from each other, and developed their own coding schemes, with each coding unit representing a thought or concept expressed by the speaker, either in what was stated or implied by the comment. The coders then met to compare their coding schemes, discuss issues, discrepancies, and insights, and then agree on a final set of codes. Some themes present in the focus group transcripts had clearly come about in response to specific discussion guide questions

posed by the researchers. Others were addressed by participants without prompting, and still other themes emerged from the discussions across topics or across groups.

The combined coding scheme was then used by each coder separately to code the first focus group transcript. Afterwards, the author reviewed how each code was applied by each coder, identifying differences and similarities between coders. The three team members met to discuss issues with the overall coding scheme, problematic codes, and differences in interpretations. Using the results of this collaborative process (a final coding scheme and understanding of each code), the author coded the remaining transcripts. The author then reviewed the main codes that were relevant to the topic of this paper, did subcoding to identify themes within broader codes, and interpreted the information to produce a draft analysis. At this point, the other research team members reviewed the author's analysis, providing their interpretations and critique. This feedback was used to produce the final results.

Analysis was done with key criteria described by Lincoln and Guba (1985) for trustworthiness in mind. Having researchers from two different sectors (academy, non-profit service provision) code the data and triangulation by comparison with survey results contributed to the credibility of the findings. Thick description of methods and efforts to include diversity in the sample contributed to transferability of the findings. Use of a discussion guide made the process somewhat more dependable, and comparison with survey results aided confirmability.

## **Survey**

The Nashville Refugee Health Survey was developed and executed by a partnership between a local non-profit organization that serves immigrants and refugees, and a private university (more details available in Lunn, 2014a). The research team included representatives

from the university and the non-profit organization. In addition, opinions from refugees in the area were solicited and incorporated at each stage of the study. The survey instrument underwent several cycles of development, including adjustments to question wording, length, and response structure. The IFH was considered when developing the survey questions, but constraints on length, availability of appropriate measures, and the topics of interest to stakeholders were also important factors. The English version of the survey (Appendix B) was translated to Somali and then back-translated to check for equal meaning (Brislin, 1970).

**Sample.** In response to suggestions by refugees and service providers, recruitment took place at Somali community locations (e.g., coffee shop, refugee service provider, Somali-owned businesses), via snowball sampling, and via door-to-door solicitation in neighborhoods with high Somali residence. The sample was, in this regard, both purposive and of convenience; this is the method typically used for this population, and because of the substantial size of our sample and the diversity of recruitment locations and methods, the author is confident that conclusions drawn about our sample can be useful in understanding the topics of interest across Somalis living in the Nashville area. Respondent characteristics are reported in Table 4.1. The survey was administered in paper-and-pencil form, but because of low literacy rates among this group, many respondents received assistance from trained interpreters in filling out the survey.

**Measures.** Respondents were asked to rate their *health in general* on a five-point scale from “excellent” (=5) to “poor” (=1), but this variable was recoded to form a dichotomous indicator of having rated one’s health as “fair” or “poor” (=1) in contrast to “good” “very good” or “excellent” (=0). Such global self-rated health measures are common to surveys and have been used and validated across numerous cultural groups (Chandola & Jenkinson, 2000; Idler & Benyamini, 1997). *Emotional health* was measured using an amended version of the Hopkins

Table 4.1  
*Descriptive Statistics for Survey Respondents (n= 145)*

	Mean or Percent	SD	Range
<i>Social Characteristics</i>			
Female (%)	47.18	--	--
Age (years)	34.65	12.34	18-64
High school education (%)	48.25	--	--
<i>Indicators of Acculturation</i>			
High English Ability (%)	54.93	--	--
Time in US (years)	7.89	5.31	1-31
<i>Health Status</i>			
Low Self-rated Health (%)	15.44	--	--
High Physical Limitations (%)	27.91	--	--
High Emotional Symptoms (%)	29.77	--	--

Symptom Checklist-25 (Mollica et al., 2004) with a total of 22 items. Respondents indicated how much (on a four-point scale from “not at all” (=1) to “extremely” (=4)) they experienced emotional symptoms in the past week. Examples include “feeling restless” and “feeling low in energy.” This instrument was designed specifically for use with refugee populations by the Harvard Program in Refugee Trauma and was adapted for use with Somali refugees by the authors of this paper. The items are meant to measure general anxiety and depression symptoms. Responses were averaged for a total score ( $\alpha = 0.91$ ), but due to the highly skewed nature of the distribution, the total scores were dichotomized. Those whose average score across the items met or exceeded 1.25 were classified as having “high” generalized emotional symptoms (=1, in contrast to low =0). *Physical health limitations* was measured using four items drawn from the SF-36, originally created by RAND Corporation for the Medical Outcomes Study (McHorney et al., 1994). Items addressed limitation in daily activities of varying effort (e.g., “Does your health prevent you from doing vigorous activities (running, lifting heavy objects, participating in strenuous sports)?”). Response options were rated on a three-point Likert scale from “not difficult” (=1) to “very difficult” (=3); these were averaged across items ( $\alpha = 0.96$ ), and then

dichotomized using a cutoff of 1.0 that was derived from a natural break in the sample distribution, but also represented the coded value for “somewhat difficult” in response to a limitation item. For all scales, if a respondent failed to answer more than 50% of the items, then his or her score was dropped from analysis.

Respondents rated their own *English ability*; “well” and “very well” were considered “high English ability” (=1) in contrast to “not well” and “not at all” which were considered low English ability (=0). *Time spent in the US* is the continuous number of years between the year of the survey and the year that the respondent arrived to live in the US. *Gender* (male=1, female=0) and *age* (continuous) were self-reported. Values were truncated at 20 years for analysis. *Education* was dichotomized from five original categories into those who had completed high school or a GED (=1) and those who had not (=0).

**Analysis.** Bivariate analyses (correlation, ANOVA, chi-squared tests, simple logistic regression) were conducted for social characteristics and health status variables with indicators of acculturation. Then, a series of logistic regression models explored the relationships of the acculturation indicators to health status while controlling for social characteristics. The base model included only social characteristics (gender, age, education). Then each indicator of acculturation (time in US, English ability) was added separately, then together. These analyses, coupled with qualitative data from the focus groups described below, help us understand more holistically the process of acculturation and its relationship to other variables in the IFH.

Missingness on the independent variables involved in this analysis ranged from 1.4% (education) to 12.4% (age). Casewise deletion would have resulted in important reductions in sample size for the logistic regressions, so multiple imputation methods were applied to these data (see Lunn 2014c for a detailed explanation). Dependent variables were included in the



imputation model, but were dropped for post-imputation analyses. All quantitative analyses were conducted in Stata version 12.0 (StataCorp, 2011).

## **Results**

An understanding of how the Somali study participants view acculturation and the process of adjustment to life in the US is provided first using the qualitative data. This section spans the main sub-elements of acculturation (behaviors, identity, values) as well as other issues of adjustment to US life that are clearly related to this topic, but did not fit within the confines of the acculturation definition or its sub-elements. The second research question seeks knowledge of the relationship between acculturation and health status. An understanding of this connection required exploration of the potential differences in cultural conceptions of health and illness. Therefore, a section describing the participants' comments on the meaning of health precedes a discussion of the connections between acculturation and health status. The final research question also probes the connection between acculturation and health status, but uses quantitative proxies to measure acculturation. In addition, a comparison is made between the utility of such proxy measures on the one hand, and the qualitative descriptions provided in the focus groups on the other. For the purposes of this comparison, qualitative results that address the prevalence of health problems and reporting of health status are included with the qualitative results from the above research questions, and referred to when answering this third research question.

### **Acculturation and Adjustment**

Using the definition from above, one way to think about acculturation is by looking at changes in behaviors, identity, and values that happened over time. Participants in the focus

groups discussed these issues, but also introduced other topics related to adjustment to life in the US, including a variety of stressors. Such stressors were often either not present prior to migrating but became manifest in the US, or were brought about via the process of adjustment. This section begins with the three sub-elements of acculturation (behavior, identity, values), and then moves to other aspects of adjustment that relate to health but do not fit into the sub-element categorization.

**Behavior.** Participants were asked about their behavior and how it differed between Somalia and the US. Some participants indicated that their behavior has changed little since migrating, while others described substantial adjustment. A distinction was made in several cases between those who migrated when they are younger versus those who migrated when they were older. One man suggested that Somalis who were older at migration may maintain their usual behaviors, eating primarily Somali foods, decorating their homes in traditional Somali fashion, and patronizing Somali-owned businesses, adding that they are intent on moving back to Somalia as soon as it becomes safe for them to do so. Somali youth—presumably those who migrated at a younger age or who were born in the US to Somali parents—were reported to be more likely to adjust their behaviors, values, and sense of identity than Somali elders.

One group of women discussed, at length, the ways that Somali women dress, and how it differs in various areas of the world:

Participant 1: The other thing that surprised me is that - I grew up wearing pants and I used to wear pants in Pakistan, but when we came here in Nashville -

Participant 2: Yeah, they will look at you.

Participant 1: It was like "You can't wear pants" ... I was like, "Why is this a big deal?" This is not the community where I grew because there were Somalis where I grew up in Pakistan - there were some Somalis in [name of town] and back home too and we were all Muslims, you know?

The discussion about how some Somali females who were resettled to Nashville have adjusted their dress, perhaps, was really one of values. The three women in the discussion agreed that the meaning behind traditional Somali dress, which is founded in one interpretation of Islam, has been distorted in the present day. One woman remarked that clothing has become about culture instead of religion, and that Somalis in Nashville seem to have their own culture that differs from Somalis they have encountered in other areas of the world.

When the facilitator posed a question about why those who immigrate to America might decline in health status over time, focus group participants at all of the sessions responded with comments about food and exercise. There was strong agreement that food in Somalia was healthier because they remembered it as being it is fresher and lacking antibiotics and preservatives. One woman acknowledged the tendency to purchase unhealthy foods in America because they are typically cheaper than healthier options. In addition, numerous participants discussed the patterns of behavior in the US that encourage vehicle usage instead of walking. In Somalia, walking was common and constant; but in the US, lack of sidewalks, overreliance on cars, and fears about safety contribute to lack of physical activity that had been characteristic of daily life in Somalia. One group also discussed a dearth of appropriate places for women to exercise. Given that some Somali women live with a religious imperative to cover themselves in clothes that conceal the body's shape, physical activity can prove difficult unless a space free of men can be secured in which the women can dress more comfortably. Also, one woman complained of having a vitamin D deficiency because she wears clothing that covers the surface of the skin. She explains:

I was here like 13 years, I haven't seen the sun. I live inside. If I go outside I have to wear this [points to clothes]. There is, I have, I always have low vitamin D because I don't exposed to the sun.

**Identity.** Relatively few participants made comments that related to the idea of a Somali or American identity, even when asked directly about this. One man described a blending of former and newer ways of living, suggesting that Somalis adapt to where they live, but do not completely change. Another described feeling half-American and half-Somali, but felt that people do not truly change their identities or values. He has been in the US for about two years and felt that he had not changed at all; another respondent in the same session commented that the only way he has changed is that he now has a new set of diverse experiences. He also mentioned that since Nashville has a substantial Somali community, one may not even find it necessary to change. These men described how some Somali adults try to cultivate the Somali culture in youth, who may never have even lived in Somalia themselves:

Always we try to, if I see young boy who born in America, I try to tell more things about in Somalia - about the culture in Somalia, about how people used to live in Somalia - so we always encourage young people who born in here to know more about their behavior-their culture in Somalia.

Some youth are so patriotic toward Somalia that another participant felt the need to remind them of their status as Americans as well:

Although there is war going there, I never seen a Somali saying bad words about Somalia. So they tell the kids, every single young kid, even if the kid seeing horrible stuff from tv or they hear about ... their parents are telling them there are nice stuff there, things will change, but the country's real, there beautiful ... and the kids get love for that country that they have never seen ... They never seen Somalia, but they are in Somalia. If you ask them who you are...I mean, I by myself sometimes tell them, "Hey guys, you are also Americans, you're not only Somalis. You're Somali-Americans. You're Americans here." But you ask them "Where you're from? Who you are?" and [they will respond] "I'm Somali. I'm Somali. I'm Somali. I'm Somali."

Interestingly, a woman who has lived in the US for much longer (more than a decade) also described herself as half-American and half-Somali, but in contrast to the above comments, described numerous ways in which she felt she had come to think in a more "American" way (more on this in the following section on values).

**Values.** Of the two group sessions that involved Somalis who have lived in the US for over 5 years, one gravitated toward talking about changes in family relationships, and both discussed changes in working and finance relationships as well as attitudes about those changes. However, family, work, and financial arrangements overlap.

In response to a series of questions about culture and values changes in Somali refugees over time, one respondent expressed concern about a trend away from the traditional pattern of children living with their parents until (or even after) marriage, and then those sons and daughters caring for their parents as they grow older. Evidently, she (and another woman in the group, who agreed) was concerned that more and more young Somalis are leaving their families when they turn 18, as is common for American youth, and failing to return to support their parents in their elder years. She called this a “great loss” for the Somali culture, although admitted that the proportion of youth who have changed in this way may be limited.

In another session, a woman talked a great deal about the difference between employment and financial arrangements in Somalia and the US. In the US, it is common for adults to be responsible for themselves, make their own money, and to be employed for pay (or for these responsibilities to be shared among a small group of immediate family members). However, in Somalia, large groups of people, even 20 or more, might depend on the income of just one individual for subsistence, and in fact, many still living in Somali depend on the incomes of their kin who have been resettled to US or other countries. Although those who do not work for pay may be contributing to the group in meaningful ways via other roles, those were not spoken of by the participants of our sessions. Instead, one pair of women discussed how they have come to appreciate what they see as a more “American” way of life, making reference to personal responsibility, self-sufficiency, and gainful employment. One participant noted the tradeoff

between spending one's resources having children versus working for pay: "They [other Somalis] have kids every month. Stop having kids! Get a job. And Work." She went on to articulate a tradeoff between family size and financial stability, telling of an argument with her mother-in-law, who still lives in Africa:

She says [the mother-in-law said to the respondent], "Hey, why you stopped having kids?" I said, "You're not getting support if I have a lot of kids"...I work, my husband, we work. And we support a lot for her and her kids. My husband's brother and sister - they live over there and he send a lot of money... she doesn't get help if we have ten kids. That's why they get help - we have three. And we still need the money.

These women also expressed frustration at the many demands made on them by their friends and family back in Africa. One said that even if she had a million dollars, someone else would not be justified in asking her for money because she earned it herself and the person requesting it had not worked to deserve it. This contrasts from the ambivalence about such arrangements that was expressed by the other group of long-term residents. They also spoke of social systems that connect large numbers of people financially, extended families being reliant on each other for economic assistance, and wealth-sharing; and in some cases examples were used to express the difficulties associated with this system. For example, one woman told a story about a family member in Africa who was involved in a tragic accident that resulted in a friend's death; the entire family was required to pay a reparation of \$50,000, the responsibility spread over many people, each of whom had to contribute what was a very substantial amount for him or her. However, they also spoke disapprovingly of Somalis who distance themselves from wealth-sharing. One woman spoke of her brother, who lives in another state (in the US), who earns what she considers to be an extremely high salary, and chooses not to pay for his niece's college education, but to pay only for the education of his own children. The respondent implied that this is a departure from Somali culture and calls the focus on only the immediate family

“selfish.” In the focus group with more recently arrived Somali men, one man spoke fervently about his pride in being able to contribute financially to family members who live in Africa. Although he works hard and earns little here in the US, he was happy to be able to send money home to support others. The topic of financial pressures and arrangements surfaced in every focus group without prompting by the facilitator; it is discussed in other contexts below as well.

**Other topics related to adjustment.** Participants described a number of experiences that related to the process of adjustment, and potentially to the broader topic of this paper – health status – but that do not fit within the confines of the concept of acculturation. Often these experiences were described as distressing, and might be likened to the concept of “acculturative stress” (Williams & Berry, 1991) – distress related to adjustment to a new culture. Participants also mentioned other distressing experiences that were not necessarily brought about by the process of adjustment, but simply described circumstances that are common among Somali refugees in Nashville. In these cases, it was not the contrast of host and origin cultures that was distressing, only that these individuals are placed in certain types of distressing situations that would be distressing for anyone, but at a higher rate than other segments of the population (e.g., extreme financial strain, separation from core family members). If such situations represented a difference from one’s former life in Somalia, then these were included as being related to the transition to life in America.

**General transitioning.** Some participants talked , in general terms, of stress that they felt related to transitioning to a new life in America, whether it involved a simpler adaptation to a new context or a more substantial change in culture. One man comments:

When I was in Somalia, I never felt so much stress, but when I come here I feel more stress because of the life in America, because of the difficulties in America because you know, come new country with different culture, different language, different thinking,

different color. So a lot of pressure are in here in America, but life is struggling, so I'm still struggling in America.

But another woman, adding that she arrived in America when she was much younger (middle school aged), said that the transition was not difficult for her because of her age. Another woman commented that her first two years in America were really difficult, but after she learned English and got a driver's license, things became easier for her. Another said that the most stressful experience for her was her education, especially because of the difficulty (in addition to the challenges of the coursework itself) of reading and writing in a second language.

*Changes in social status.* One issue discussed in literature involving immigrants is a decrease in social status in a new country, often directly related to lower status employment (e.g., Aycan & Berry, 1996). One woman explains that in Somalia, there is stigma against lower class jobs, and these jobs would be unacceptable for someone who had a higher status in Somalia; however, in America, Somalis are sometimes forced to take jobs that are undesirable to them. Having become comfortable with this reality, one woman related the difficulty in getting her mother to understand:

My mother is 70 years old. So, I said, "Momma can I sponsor you to come to United States?" She said, "Can I get a job if I come?" I say, "Yes, what kind of job?" I tell her, "Cleaning?" She say, "Uhuh, not cleaning." I say, "That's what I made the money from, momma." She say, "No, I am not like you. I am not going to clean." I'm like, "OK, what do you want to do? You're 70 years old. You don't know how to read, how to write. What there is you can do here?" [says with laugh]

One man said that Somalis sometimes have had difficulty documenting their educational credentials from other countries, and may have therefore had to repeat coursework unnecessarily. Another woman gave an example of a friend who owned a successful business back in Somalia, but had to sell the store when she moved to America; her work here was much lower status and she had difficulty earning money to support a standard of living like she had been used to, which



caused her great distress; the woman telling the story attributed her friend's eventual hospitalization for mental illness to the stress brought about by this contrast in social status.

Another woman listed a great many changes she faced in adjusting to life in America, but explained that, over time, her situation and outlook improved:

You leave your place, you leave people [who] know your value ... you high person [person of high status], but you come here, nobody knows you, they look at you like you lowest people because you immigrant, don't speak English, no job ... and your value is changed completely. [Back in Somalia] you have value, everybody knows you, everybody like you, everybody come to your house, everybody talking to you, everybody asking you idea, everybody inviting you come their wedding, their special place, then you was like, valuable person. But when you come here, nobody knows you, everybody speaking ... "You understand me?" Nothing. So, you just thinking how good you are in Somalia and how you get [have become] unknown person here. So you used to think, like, how can you go back? ... I was like...five years...I will not be in United States five years. My first money, I have to save it, I'm going back to Somalia... But the things getting better. You learn the language, you learn people, people not bad, but you don't understand each other, that's all... [Then] you got opportunity to work, opportunity to go to school and make friend. Things getting better, get whatever you want to, buy whatever you want to, support your family back home. Then after that things getting better and better and after five years you don't want to go back. You think, "Hmm I like here. I have friend. I have family. I have job. I don't beg nobody to give me money. I can take care of myself. I can take care of others."

For this woman, self-sufficiency was extremely meaningful, in addition to the pride that she felt in being able to contribute to her family in Somalia financially.

*Changes in social roles and social support systems.* In both of the men's focus groups, respondents discussed distress related to increased responsibility and taking on a wage-earning role in one's family:

In Somalia... we were young people...Coming out from the support of their families ... With a place to fall down if they could not keep up with the life outside...If you cannot support your own self, you could fall back to your parents' house or your older brother's house or your cousin or your uncle...over there the only worry that we had was when you will get hit by a bullet...But not that much other worries, even if you could not eat three meals a day or even manage one meal a day, it was still beautiful to me - that's how I have seen it. Even in the midst of the civil war - all of those going. Coming here, it comes completely with the responsibility and without all of those stuff that you had. So you are not a young person anymore - you are a responsible person. You don't have that base to

fall down...you have a lot of responsibilities. So the stress is high. Even if you fulfill your number one obligation - your responsibility to your parents - then the siblings are there, and then other relatives will come. So, for example, I mean, it's difficult to save [money], you cannot save. Sometimes you will even send the rent of your house [back to Somalia] because if you support your family then there are others who are in need and you know you have \$100 or \$200 in your account ...it's difficult to say no to a person that you know if you don't give them something today that they will not manage their next meal. So stress is high.

The above quote touches on a number of different issues. Stress, as described by this young man, comes from an unfamiliar burden on one's shoulders, but also a lack of safety net that had previously been provided by extended family and social networks who could be of assistance if one is in need. This stress is compared as equal to, or even worse than, the possibility of getting shot or chronic food insecurity. In addition, the burden of supporting Somalis back home is intensified by (a) financial resources that are strained, sometimes not even enough to cover one's own expenses, and (b) pressure that comes from the knowledge of insufferable conditions back in Somalia, and the difficulties that those who continue living there will face, especially if one is not able to send them financial support. Another young man suggests that the stress of life in America has aged him prematurely:

I think it's for the changed life. To be alone suffering without your family. When you come here you going to get a lot of things you're not used to. The first question my brother asked me after greeting me was "You got old." I'm younger 5 years than him! And the first thing he asking me is "You get old, why?" That's the question.

All of the women who participated in the focus groups also work for pay, and some echoed comments about the difficulties of being able to support both themselves here, and Somalis living back home. However, the women's groups also brought up how social interactions differ between Somalia and America, emphasizing the potential for loneliness in America, and a lack of social support that was much more common in Somalia.

Since 1992 - when I came on this country - I feel like "What?" "Where's the people?" "Where is my family?" "How can I go back?" I got emotion. Night, especially, night.

Said "Oh, you're alone. Like this. You can't go anywhere, you don't know anybody... person can get, like, mental illness. Because you talk yourself all the time. You don't have people to share your idea, to share your emotion, to do something, nobody knows you, nobody to talk to you.

One particularly illustrative example came from a narrative about how women are treated when they give birth in Somalia. For the first 40 days, friends and family visit, bring the new mother anything she might need, allow her to rest, help watch other children, etc. But after resettlement in the US, this type of tradition is difficult to maintain:

Yeah, time allowed us for us to do those, but over here, you know, I live in [name of outer suburb]. If somebody have a baby in somewhere in [name of different suburb], it's just gonna take time for me to travel and you know, it's all that so, we just don't have enough time.

Another expressed that women felt freer in Somalia because they were able to access instrumental support easily, such as babysitting, if they wanted to leave the home. Another woman added that in America, Somalis still help each other, but the social networks in the US are not as extensive, and there are people here who do not know many other people, so they do not have the networks to draw upon. In addition, social interactions in Somalia were convenient, commonplace, and often did not require planning. For example,

Everything's walking. Go to school - walk. Go to grocery store - walk. And ... as you are walking from your house to the grocery store you can meet, like, ten people you know - stop with them "How you doing?" "How's your children?" "I didn't see you last night" "Oh, that's happened to you" ... and then you move on. Walk like, oh, like, few steps, then another man or woman stops, "Oh, how you doing?" "Where you going?" Talk about, like, from your house to your store you might meet like ten people from your village or your neighborhood. Tell you, just come back then your house, play with your children, walk around, it's free life.

The difficulties arising from being separated from family members was also mentioned in several of the focus groups. For example, if a family member passes away, it is difficult to travel back home. And though one might want to visit at other times to see their family and friends,

doing so is very expensive, both in the cost of the travel and in the expectation of cash and other gifts to be given to family and friends.

In Nashville, specifically, a large Somali population allows for concentrations of Somalis in certain neighborhoods. Some spoke of this as useful and talked of an inherent trust and connection that Somalis have with each other even if they do not know each other. One young man said, “If I’m not with another Somalian people, I feel poor.” However, another young man suggested that a potential downside to having many Somalis living together is that it can be difficult to learn English, which can be a very helpful skill in U.S. life.

***Disconnects.*** One emergent theme across the focus groups was disconnection of several kinds—this included unmet expectations, misunderstandings, misperceptions, and other experiences that highlight mismatches between groups of people, or between one’s current and former selves.

Respondents talked of disconnect between what they expected of America and what it was really like. For example,

Oh, so different, sooo different. When we came to United States we think, if you go to United States, you will be get house, car, money's everywhere, so you'll be rich, and help your family back home. You be like get easy money. But when we come here, there was no easy money. There was no house waiting for you. You have to clear your own life. But the first few years everybody was thinking "How can we go back?" "Can I go back?" "Can I get ticket to go back?" There is no way to go back.

While those who resettle in the US discover the truth rather quickly, some who remain in Somalia continue to have wildly inaccurate ideas about life in America:

And if you don't [send lots of money], everybody knows you, everybody have relative with you if you don't send money they will hate you. They think you've changed. You've become American, you don't care nobody. That's more stressful.

She goes on to give the example:

Participant 1: Sometimes they will call you say, "OK send me \$4000 tomorrow."

Facilitator: \$4000 tomorrow?

Participant 1: Yeah.

Participant 2: Oh, they don't know how much money we have.

Participant 1: If you say, "I don't have money." [then they will respond] "That's just wasting talk." ... you talk like two hours, try to make them understand.

Participant 2: To explain. They never understand.

Even disconnects with other Somalis living in the US were spoken of, such as disagreement over appropriate dress or social norms about taking care of ones parents (discussed above).

An unsurprising disconnect that some participants mentioned was one between Somalis living in America and the U.S.-born, and that this sometimes took the form of discrimination. Some mentioned being looked at strangely, others described encounters where native English speakers became frustrated with them because of their difficulties with the language. Another described how difficult it can be for young Somali women:

Young people at the school, boys and girls, especially to the girls... because of the way that they dress that questions come to them. And believe it or not, they are really strong compared to the boys. Because boys can blend with other boys until somebody asks them their name and they say "Mohammed" or "Abdul" or "Ali" but before that, they are just among the society. But our girls, they carry that identity and the minute that she walks out of the house she knows that there are questions waiting for her because of, of the hijab that she is wearing.

Later, the same man provided an intriguing explanation of what freedom means to him, and how it is lacking for Somalis in America.

Freedom, number one, has basis on the culture... You [meaning the facilitator, who is American-born] are free in America. You feel that freedom. You have it. You go to Somalia, you will lose that freedom. Because of maybe your skin color, because of your religion, because of your dress, which is different from those people. I mean, you cannot have freedom when there are a lot of questions coming to you or a lot of eyes looking at you or there are some people who have hate in their heart against you because of simply who you are... Same goes here [America]. The Somali young girl who dress wears that huge hijab to the ground, when she goes out, all of those questions are subjected to her - she is not free. Somebody is bullying her. She is not free.

In contrast, one Somali woman who has lived in the US for more than a decade, spoke of what could be considered freedom, and how her experience resettling in the US and new skills that she has learned here have created opportunities for her:

I can live wherever I want to. I can live - Europe, America, wherever, anyplace, new place, I can make a life. I can take care of myself. I can get a job. It don't matter what kind of job, I can get a job. And I can work. ... I can live anyplace in the world. I can be friend anybody...so life is gonna be easy - not isolating - easy for me now. If I go back to Somalia, I can make money, I can create something new, I can encourage a lot of people, I can change a lot of people's lives. So I have a lot of things in my mind but - I can go back to Somalia - I do this - I do that...I can change a lot of things now. But before it was like I knew only me and my family and not thinking too much.

As shown in the above results, there are many facets of adjustment to life in the US and many different experiences. The next section seeks to present the participants' understanding(s) of health and illness so that they can be related to the process of adjustment.

### **Health, Illness, and Reporting**

According to respondents' and research team members' observations, self-rated health is a combination of what one believes about his or her own health, and what he or she is willing to report. This section begins by addressing how the respondents conceived of health and illness, and is followed by comments about reporting one's health status to others.

**Definitions and concepts of health and illness.** One of the main questions posed in focus group sessions was about the nature of health – what does it mean to be healthy, and how would one go about assessing one's own health (for example, when answering a survey question that requires categorization of health from poor to excellent). There was variation in responses about how to choose a rating for one's own health status. Some would rely on what they had been told by doctors or medical testing. Others would rely primarily on how they feel; and others would consider both the input from medical assessment and self-assessment. Many participants

said that their self-assessments would cover all types of health, although some said that if asked about general health, they would think only about the physical aspect, and not include emotional symptoms. In fact, one respondent speculated that 95% of Somalis would not consider emotional issues when reporting about their general health, suggesting that Somalis do not see emotional problems as a “health” issue. In addition to the above, several themes emerged about conceptions of health status among Somalis.

***Health as dichotomy.*** Many respondents spoke of health status as a dichotomy of good or bad, with little in between. In regard to physical health, participants in three of the four focus groups used the same types of descriptions for good health, which simply required that one be able to function normally. For example, a young man suggested that “Being... ill sometimes can be defined for just not doing what you are supposed to do.” Others mentioned common daily activities, like walking, talking, and going to work as evidence that one’s health is good. One woman explained that,

Yeah, if me I understand is problem like every problem – family problem, health problem, emotional problem, physical problem. But when you ask the Somali community they may be thinking if you sick, like, there's no problem - everybody gets sick. Problem is like, big thing, like you have somebody die...

The facilitator asked about this phenomenon in both of the women’s focus groups; participants agreed that there is a tendency not to think of health as poor or problematic unless one’s problem is severe.

***Healthy by default.*** The above also contributes as well to a sense of seeing oneself as “healthy by default.” In other words, if there is not something very wrong, then one is healthy. Furthermore, some participants felt that the limited access to medical care in Somalia or in refugee situations contributes to a sense of healthiness in that it allows individuals to remain unaware of their health problems. One young woman explains,

- Participant: If you look at them, where they come from - you know the background - they might not have healthcare. So they don't know if they had all these problems. Like you know, in the United States, in general, each person knows, you know, what he or she been through or what problems they have because the doctor says this ... but back home ... we are healthy - we don't have no problems...
- Facilitator: So when you say "back home we're healthy and we don't have problems", you mean that back home, you haven't been to the doctor and they haven't diagnosed the problems?
- Participant: Yes.

Another notes that Somalis tend not to use medical services even when they are available unless there is a notable or serious problem. In an explanation about why Somali women tend not to seek prenatal services, one says,

We just think as long as we are getting up and we're feeling fine and we're walking, and you know, there's no arms falling off or anything like that, we're not going to go see a doctor.

Interestingly, one participant talked about how having access to medical treatment contributes to feeling healthy, regardless of whether one actually uses the available services. He explains the following, as the others in his focus group nod in agreement,

I came to America last year. The government ... give me a health card for 8 months... For that certain time, I just go to the doctor, checking physically, but I didn't get any problem – whether it's accident, whether it's just a natural sickness, I didn't get. But when the 8 month has come to an end, it's like coincidence, I have pain here and I have pain here, and the card is expired already. So like most Somalis, when they have the card, they may stay healthy and they just have the card. When the card time is over or the child is grown up, and the card time has expired so that is the time you think now you can visit the hospital and the card has expired.

***Health as relative.*** Another important element to assessing health was the tendency to compare oneself to others – being healthy by virtue of being healthier than someone else. One man attributed this to his religion, saying:

You don't always, as a Muslim, think of your own self, but you also think about others. You compare yourself to others - what you have and what they don't. So, if you are in pain, screaming, there is someone who can't even scream at all...if you have a fracture or



a broken bone in your body, there is someone who lost a limb. If you are dying and you're on deathbed...there is someone who is already dead, under the ground.

In a different focus group, a woman made a similar comment about health status being relative – that if your condition or illness is not worse than the comparison, then you should consider yourself to be fine (see quote below). She adds the idea that it goes against her religion to “complain” about an illness:

As Somali, we are Muslim and we believe if you have - whatever happened to you - it was something from God, so you accept, you don't complain...if you have like, diabetes, you look at someone who has cancer, and you think you're fine.

Given a tendency to compare one's own condition to that of others, and given that Somalis—it was commonly asserted in the focus group discussions—have seen and experienced no shortage of pain and suffering, it would therefore be quite typical for an individual to consider his or her own health as excellent when so many others ail from extreme illness or injury.

***Emotional health.*** Similar to physical health, emotional health, too, was discussed as a dichotomous condition, lacking the multitude of different symptoms, illnesses, and gradations recognized by Western medicine. One respondent drew from her experience working with Somali parents:

The teacher or psychologist say... "Your child has emotional problem or depression." [then the response from the parent is] "She is just shy..." ... If you say "Your child crazy" like, lost his mind - yes, they understand. Tell you yes or no. This is fine - yes or no. But nothing between them.

Although both physical and emotional health seemed to be conceived of dichotomously, the severity necessary to categorize an individual as unhealthy differed. As described above, one must have severe symptoms to be considered as having a physical illness; in contrast, even relatively minor display of sadness or emotion is considered strange without a socially acceptable explanation. Unless there is a valid reason to be upset, minor symptoms of emotional

problems can be interpreted as “crazy” or ill. For example, one woman gives the example of a person who is lonely and isolated; in Western psychiatry this is a legitimate reason to exhibit depressive symptoms, but some Somalis may not agree unless something catastrophic happened:

If, like, somebody die in your family, yeah, people understand you will get emotional and will comfort you. Or you're very sick, like you have cancer they will come to you and pray for you, but if you just get this for maybe you're, you don't have a lot of friend, you don't have where to go, just stay inside the house with the children, cook, clean, children, cook, clean, sleep - then the people think you fine. And you can't, they don't understand if you say you have this – [they would say] "Nobody's dying in your family - where does this come from?"

Another participant brought up the issue that the Somali language lacks a way to express minor emotional distress: “...and there is no Somali word you can say "stress." So you have to understand stress. When they heard, they only know stress like stress is craziness...So it's complicated.” Another woman comments, “In our society, you know, mental...depression is mental illness...and once you say "mental illness" they are like "uhoh - hold it - I am not crazy!" In both of the men’s focus groups, a comparison between American and Somali perceptions of what constitutes a legitimate cause of emotional illness came up as well. The participants seem to suggest that Somalis are hardier – that they would not succumb to mental illness simply from experiencing minor problems. For example:

The Western culture - that may be, as the Somali's perceive - a minor thing is depressing. Things that Somalis see as really really minor will depress them [Westerners] and they will need some consultant [Psychiatric care].

In another focus group, a man explained;

Somali people actually not thinking or worrying about a lot of stuff over here. I've seen a lot of American people stressing and thinking about a lot of crazy things. And we just look at them and we're like, I mean, that's not something actually to worry about. [other participants laugh in agreement] We feel like it's just nothing, you know, comparing to what we have back home.

The stigma associated with mental illness was also discussed in several of the groups. A poignant story from one woman told of how others in the Somali community relegated her friend's identity to the illness itself:

There was a lady that I came to know in Nashville when I moved here. And before I met her, I used to hear from people I met, "Oh, the lady who was sick, the lady who was sick..." So after a while, I'm thinking, "OK, what is wrong with her? What does she have?" "Oh, she had a baby and she had..." "Oh, depression, OK." ... And I said, you know, "Does she have a name?" And "Yeah." And I said, "Can you please just call her by her name?"

The stigma of such illnesses was often discussed in conjunction with the idea of denial or avoidance. For example:

We don't discuss mental illness, we don't deal with mental illness. It's a stigma in our society, so you'd rather downplay, you rather not deal with it. If someone has post-partum depression, they'll never talk about it unless it gets to a point where it's irreversible, they cannot get proper treatment.

In addition to the above issues, some conditions that Westerners consider to be health problems are either not health-related or not problematic by the standards of other cultures. One young Somali woman commented that:

Participant 1: Like 75% of the names that you get in the United States does not exist in our country. One of them is like, what was that, what is the thing that kids have when they are so hyper?

Facilitator: ADHD?

Participant 1: Yeah, ADHD. We don't consider that as any illness.

Participant 2: Yeah, it's just a hyper kid.

Participant 1: Yeah, but you know, you hear those names over here and they tell you, "This is a problem. This is an issue with the kid." And we are like, "There is nothing wrong with him. It is fine."

Comments about Western doctors labeling normal behavior as an illness or problematic were interwoven with comments accusing Somalis of avoiding or failing to accept the "truth" about their own health or the health of their children. For example, Participant 2 from the above exchange later says:

But the underlying community problem that we have with health issues is, as long as there is an illness, as long as the illness is accepted, you can go get treatment, like diabetes, hypertension, things like that. But as long as it's one of those weird diseases that we never heard of before, we'd rather avoid and just not deal with.

**Health Status and Reporting.** Participants were asked to interpret the fact that Somalis reported emotional symptoms and health problems at lower rates than Americans with similar socioeconomic backgrounds. In addition to explanations, detailed above, that concern the way that Somalis think about health and illness, some participants talked about whether or not they believe that there is more illness in the population than is reported.

*Speculation about “true” health status.* A number of different health conditions were mentioned by name, but comments varied. When asked about emotional issues, some respondents focused on current stressors, taking the view that if everything in one's life is going well, he or she will not have any emotional illness or problems. One participant reasoned that since things are better in the US than they were in Somalia, the Somalis who live here do not have any emotional illness. In his words:

Yeah, I would say everybody is totally good. They feel okay. You know why? Because most of the people... when they come to America, are [from] poor countries, and they get a job, they depend on themselves, they can get whatever they want. You know, make them happy actually. Because they never get those kind of opportunities back in Africa, you know what I mean? So like most of the people when they get their jobs, they get their medical cards, they get everything, they feel happy, actually. They don't have any emotions, they don't have any cryings, something like that. So it's like opportunity for them to come to America, that's how they feel like.

Another participant agrees, again appealing to the relative circumstances in the two countries.

When you are in Africa, you see a lot of people dying for hunger. A lot of people, you know, don't have jobs. Even they don't have no medical cards. They don't have nothing over there. If they eat one time a day, some people are happy, more than happy even... But when you come here you can eat like 5 times a day or 6 times a day – it depends still on your pocket – and you still have the job that, you know, makes you better person that makes you to feel happy actually.

In contrast, a woman in another focus group asserted that there is a higher prevalence of depression among Somali women living in the US than in Somalia, and attributed this to the different (and lacking) social support systems, and additional stressors in the US. In response to this, one woman in the group expressed concern that the quantitative survey being conducted would not reveal an accurate prevalence of health problems, as she believed that the prevalence is much higher than Somalis are willing to report:

I think there is a lot of people that's depressed, especially with the change that is taking place. I know a lot of females that like, stays home and you know, doesn't do anything, babysit their kids. If you, if you really watch them closely you can tell they are so depressed and they are going through stress and everything. It's just that I strongly believe 50% is not reported - only like, couple percent is reported. And I see sometimes, like, because of [work with a mental health agency] I get to meet a couple of them who is really like, going through that. And I mean, it's just that, I think that if we report it, it's going to be totally different than you know, what this research study say.

In response to the above comment, the first participant agreed, but suggested that the unreported portion of depressed Somalis is even more extreme—80 to 90 percent.

Other participants focused on traumatic experiences, and speculated that Somalis have a lot of emotional problems due to those previous circumstances. A man explains:

But imagine emotionally...90 percent of the Somalis who live in this city are people who are from refugee camps ... They have seen horrible situations, they have seen death in multiple phases, they have walked long distance to just arrive safe location, they have seen starvation. If they didn't even witness by themselves they have seen the pictures...So how could somebody be like, really really emotionally stable if he or she has been in that situation or somebody that they know was in that situation?

On the other hand, the same participant later explains that Somalis are hardy and resilient, and that despite the trauma they have experienced, they continue to function:

I think it's a combination of religious convictions and strong nomadic culture...and they are really strong people. That's what's holding them back from falling into those psychological situations that they would need to go to a psychiatric [psychiatrist]. Some people, yes, they will go over the cliff and fall down and it's a very horrible situation and I have seen it. But most people, I think they get the first hint from inside, from them, from their religious convictions, from that comparison that starts from the beginning.

Anything that they are dealing with, like I said, they compare it to another situation and they try their best to carry on and keep going.

This comment ties back into the idea of health status as dichotomous, as the speaker uses the metaphor of a cliff that one falls over to represent becoming mentally ill, explaining that Somalis are often strong enough to keep from going over the cliff despite their very difficult experiences.

***Reporting health issues or problems.*** Some participants offered explanations for why a survey respondent might have a health problem, but not report it. Two men in one of the focus groups agreed that people, especially young men, might be reluctant to report emotional symptoms because they do not want to look weak or selfish. Another woman suggested that the stigma of mental illness, and the potential repercussions of such a diagnosis is a detractor from admitting that one even has any emotional symptoms at all, whether or not they would constitute an actual illness.

The biggest stigma, like with mental illness, if the questions after a mother gives birth and we're filling out their postpartum stuff and, "Are you feeling OK? Do you feel like crying for no reason?" [the mother responds] "Just say no no no no." ... mental illness is the biggest, biggest problem that we do not wanna deal with. Because back home if someone had little bit of mental issues or whatever, they were crazy, they were confined somewhere. You know, it wasn't dealt with.

Another woman suggested that people do not want to accept that they have an illness and therefore will avoid being diagnosed and reporting it, commenting, "Once they hear this is an illness, they always stay away from it - even depression, stress... 'Oh, I don't have this.' Because it's disease, even though they know they had it." Furthermore, a fear of having an illness documented permanently deters reporting, in combination with a fear that reporting will result in erroneous diagnoses. One woman explains:

In my experience, especially when you have something written down ... there's a fear that one of these days it will come back to them. "Yeah, the other day you said you were not feeling well. Let us check you" - kind of. So there is that fear of whatever you say is gonna come back to you.

A woman who works in a health care setting observed that some Somalis are distrustful of American doctors and fear misdiagnosis:

I've noticed with my job, people don't want to say they have these illnesses because they think there are going to be other issues that will be following them... [they say] "No no, as soon as you tell them, they'll tell me I have the same illness." So a lot of it is misconceptions, misunderstandings of the American healthcare system, fear of these things coming after you for whatever the reason is. So there is, you know, so it's easier for us to say, "I am excellent. Doing really well." Rather than dealing with all kinds of questions that come after.

Participants from two different focus groups both suggested another fear, which is that revealing that one has certain symptoms will result in being treated from a Western medical perspective that conflicts with their values and preferences. For example,

[People worry that if] they disclose this information, the doctor thinks that they are in poor health situation, that the doctor will compare them to, to the Americans, because he is a doctor who knows this culture, not their culture. So, instead of maybe like hearing them on the focus or under the lens of Somali culture, he will heal them with the American culture or this society - the Western culture - that may be, as the Somali's perceive - a minor thing is depressing. Things that Somalis see as really really minor will depress them and they will need some consultant [psychiatrist] or not only consultant but also, you know, take some kind of medications. And they have heard that those medications will affect them. They think that, remember when it comes to psychological issues or psychiatrics [psychiatrists] themselves, the advices that they are giving is kind of like secular and we are not a secular society yet.

Other potential explanations are that people who have been through trauma may not want to report emotional problems because they do not want to relive the experiences or talk about the trauma, or that reporting symptoms of health issues is a private thing and not something that one would feel comfortable doing in all situations.

But there is a lot of, there are a lot of psychological problems in Somalia. And everybody, every Somali have been some problems in their lives...but when it comes to expose, to tell other people, we don't like it.

## Quantitative Survey Results

Descriptive results for quantitative survey analyses appear in Table 4.1. Forty-seven percent of the sample were female, the average age was 35 years, and fewer than half had a completed a high school education. Fifty-four percent said they speak English well or very well, and the average length of time living in the US was 7.9 years (ranging from 1 year to more than 30). Approximately 15% reported their general health as fair or poor. The physical and emotional health measures were dichotomized such that about one-quarter to one-third of the sample fell into the “high symptoms” category (27.9% for physical limitations and 29.8% for emotional symptoms).

Table 4.2 reports bivariate analyses. Males tended to have better English ability than females, as did younger Somalis, and especially those with at least a high school education (91.2% speaking English well, in contrast to only 22.2% of those without a high school education able to speak English well). Better health status was associated with being able to speak English (lower proportions in the ‘low’ self-rated health category and lower proportions in the ‘high’ physical limitation category; emotional symptoms were not significantly related). Older Somalis and those with a high school education were likely to have been in the US for longer periods of time than younger or less educated Somalis. In bivariate analyses, none of the health status measures were significantly related to time spent living in the US.

Results of the series of logistic regression analyses are reported in Table 4.3. Age was the only significant predictor of self-rated health, with older respondents more likely to report lower self-rated health. In addition to age as a risk factor for high physical limitations, females were significantly more likely than males to report more physical limitation. None of the included predictors were significantly related to being in the high emotional symptoms category.



Importantly, neither of the proxy measures of acculturation were significantly related to any of the measures of health status.

Table 4.2

*Bivariate Relationships between Indicators of Acculturation and other Variables*

		High English Ability		Time in US (years)	
<i>Social Characteristics</i>					
Sex	Female	41.79	10.10**	7.75	0.08
	Male	68.49		7.99	
Age		0.94	13.50***	0.27*	
Completed High School	Yes	91.18	67.39***	8.72	3.96*
	No	22.22		7.04	
<i>Health Status</i>					
Self-Rated Health	Low	28.57	7.59**	8.24	0.24
	High	61.06		7.66	
Physical Limitation	High	38.89	5.04*	8.25	0.11
	Low	60.87		7.93	
Emotional Symptoms	High	56.41	0.00	8.44	0.24
	Low	56.04		7.95	
<i>Indicators of Acculturation</i>					
English Ability	High		--	8.97	7.20**
	Low			6.73	
Time in US		1.10	6.82**	--	

*Note.* Different types of tests were performed based on the nature of the variables involved. Sex with English, education with English, and each of the health status variables with English were chi-squared tests. Sex with time in US, education with time in US, English with time in US, and each of the health status variables with time in US were oneway ANOVA tests. Age with English and time in US with English were logistic regressions. Age with time in US was a Pearson correlation.

\*p < .05 \*\* p < .01 \*\*\* p < .001.

**Related results from focus groups.** Participants in the qualitative focus groups mentioned English language acquisition as something that was very useful in the US and that facilitated independence. One woman spoke of being treated rudely by native English-speakers because of her struggles with language, for example, which probably distressed her. However, no

Table 4.3

*Logistic Regression of Health Status on Indicators of Acculturation (imputed data)*

	Low Self-Rated Health (n=136)				High Physical Limitations (n=129)				High Emotional Symptoms (n=131)			
	Base	English	Time	All	Base	English	Time	All	Base	English	Time	All
<i>Social Characteristics</i>												
Female (ref=male)	1.56	1.54	1.56	1.54	2.33	2.45	2.33	2.46	1.59	1.59	1.59	1.59
Age	1.07**	1.06**	1.07**	1.06*	1.04*	1.05*	1.04*	1.05*	1.02	1.02	1.02	1.02
High School Education (ref=not high school)	0.53	0.74	0.54	0.74	0.55	0.39	0.55	0.39	1.73	1.72	1.72	1.72
<i>Indicators of Acculturation</i>												
High English Ability (ref=low)	--	0.63	--	0.63	--	1.66	--	1.67	--	1.01	--	1.00
Time in US (yrs)	--	--	0.99	1.00	--	--	1.01	1.00	--	--	1.00	1.00
<i>Model Information</i>												
Model F	3.31*	3.19*	2.57*	2.70*	4.05**	3.18*	3.19*	2.60*	1.17	0.47	0.93	0.74
Pseudo-R <sup>2</sup>	.09-.12	.09-.12	.09-.12	.09-.12	.11-.16	.12-.17	.11-.16	.12-.17	.01-.03	.01-.03	.02-.03	.02-.03

*Note.* All dependent variables are coded such that the undesirable health status =1 (low self-rated health, high physical limitation, and high emotional symptoms). Pseudo-R<sup>2</sup> values were not available for combined imputed analyses; the values provided represent the range of pseudo-r<sup>2</sup> values when the logistic regression is performed on each of the 20 imputation datasets individually.

\*p < .05 \*\* p < .01 \*\*\* p < .001.

explicit connections were made between English ability and health status. In addition, one respondent emphasized that there is a large Somali community in Nashville, and that a Somali person can function there without necessarily adapting. Therefore, English language acquisition could conceivably be related to health status, but only through potentially long mediation chains. Furthermore, the effect of English on other factors might be moderated by various circumstances, such as whether one actually needs to be able to speak English in order to live the life he or she desires.

Several focus group participants also described processes of adjustment to the US, but these varied in nature and in the effect that they may have with health status. For example, two women talked about struggling a great deal during their first five years in the US, but feeling comfortable later. Others noted that age at migration might bear on difficulty or strategy of adjustment. Still others said that they have not changed and predicted that they would not change as time went on. In the context of these perspectives, it is not surprising that the quantitative analysis using time in the US as a predictor did not reveal any relationship with health status. It is possible that there are trends, but that many other life circumstances affect the trend, and without including them in the model, the positive and negative effects neutralize each other.

As reported above, focus group participants also provided key insights about the way that health and illness are conceived of by some Somalis, and the reporting of both physical and mental illness. To the extent that researchers and their study subjects do not have the same understanding of health status, using a self-report measure can result in misinterpretations of data. Furthermore, if Somalis do indeed choose not to report their health problems because of fear of the American health care system, stigma against certain types of illness, or other reasons, this can have a substantial impact on data validity.

## **Discussion**

This study used mixed methods to explore the concept of acculturation and its relationship to health status among Somali refugees residing in Nashville, TN. It is important to understand the health of refugees because they are a group that, due to past experiences and current struggles, may be particularly vulnerable to health problems. Qualitative data from focus groups provided rich contextual insights about the process of acculturation, the concept of health, and reporting of health status. Quantitative data from a community survey provided a foundation to compare the predictive ability of proxy measures of acculturation to the substantive lay explanations of health status given by focus group respondents.

### **Acculturation and Adjustment**

Somali participants in small focus groups were asked to discuss changes in behaviors, identity, and values that have occurred to them or that generally occur to other Somalis, in their perception. They provided information in response to specific questions about these three subcomponents of acculturation, but also spoke of stressors in daily life, some of which were related to the process of adaptation or transitioning; others related to changes in social status, roles, and support; and, lastly, others concerning “disconnects” with their own prior expectations, or those of other Somalis, or other Americans. There was a great deal of variation in how respondents perceived and described their adjustment processes, including varying intentions about whether or not they wanted to adjust, as well as judgments about traditional Somali culture that ranged from high esteem to harsh criticism. A few experiences were mentioned by most respondents; these included high rates of exposure to trauma, intense social pressures to remit money to family and friends still living in Africa, financial strain, and adjustment to reduced

support systems in the US. Other studies of Somali refugees have reported similar results (e.g., Elmi, 1999; Hammond, 2011; Lindley, 2011). One such study described the change in social support as the loss of an “entire welfare system” (Elmi, 1999). This loss, combined with difficulty accessing high-paying jobs, and a responsibility to support others financially in addition to oneself, can be highly distressing.

Despite the fact that these topics were discussed in some way during every focus group, individual participants had differing views on the positivity or negativity of these experiences or conditions. Some cast the responsibility to remit as something positive that brought pride and strengthened relationships; others viewed it as an unjust burden on themselves to help people who do not deserve it. The focus group data can reveal many potential pathways through, and facets of, adjustment to a new country, as well as the complexity of these processes and differing perceptions and interpretations among Somalis of even the same types of experiences.

### **Acculturation and Health Status**

When asked about connections between life in the US and health status, participants felt confident that changes in diet and physical activity since moving to the US had impacted their health negatively. Women especially, expressed concern over a lack of places where they can be physically active, which has been reported in other studies as well (e.g., Devlin et al., 2012). All focus groups also discussed numerous and diverse stressors faced chronically in America. Loss of social status, loss of social support, adjustment to new social rules and interactions, and changes in social roles, all caused distress for our participants. These stressors, combined with a lack of social supports, could contribute greatly to emotional illness, and indeed, many

respondents made this link explicitly. In addition, several respondents noted the very high rates of trauma among this population that could increase risk for emotional issues.

Other types of adjustment, however, may not have links with health or these links may be unclear. For example, statements about changes in culture and values were mixed, with some respondents reporting substantial changes in ways thinking for themselves, or cultural and familial traditions among people they know, and others maintaining that they have experienced little substantive change in this regard. Some participants talked about having a combined Somali and American identity, but there was little elaboration on this concept. Overall, little of what was mentioned as relating to identity and values would have a clear causal relationship to health status without further exploration.

The other major issue in understanding the link between acculturation and health status involves how Somalis view health itself. The participants of this study, not unlike those in other qualitative work with Somalis, noted key differences in the way that they think about or report health status – a tendency to deny or avoid discussion of mental illness, stigma against mental illness, and a tendency to consider health as good unless a very severe problem is present, and others (Elmi, 1999; Guerin, Guerin, Diiriye, & Yates, 2004; Warfa et al., 2006). A consequence is potential inaccuracy in measures of health status that involve self-report (discussed below).

### **Proxy Measures of Acculturation**

Based on responses from qualitative focus groups, current chronic stressors are often a major concern for resettled refugees. Some of the distress can be attributed to changes, transitions, and adjustment to the US – acculturative stress. However, other stressors mentioned remained even after participants had lived in the US for many years – stressors that were

characteristic of their life in the US, such as financial strain and lack of social support. As mentioned above, the variability in responses suggested that there is not a uniform experience of life in the US. Experiences, stressors, and one's ability to deal with them, can vary a great deal. None of this is captured with a proxy measure of English ability or time in the US, and the intervening mechanisms between those characteristics and one's health status are not only poorly understood empirically, but are difficult to speculate about theoretically. The quantitative data collected support this notion; neither of the proxy measures for acculturation had any relationship to reported health status when social characteristics were controlled in models.

Indeed, when asked about the causes of poor health or specifically about reasons why health might change with time living in the US, participants focused primarily on poor diet and exercise, better protection against exposure to famine or communicable diseases, and great distress resulting from traumatic experiences or chronic stressors in day-to-day life. Neither English ability nor amount of time living in the US approximates these substantive issues conceptually, and the quantitative data show that they are not useful as predictors empirically.

The way that Somalis understand health and illness, and their trust in health professionals or researchers, both affect what they report. Therefore, it is very important to quantitative studies of health among any group of people from another culture, to understand how this might affect reporting and use this to adjust the interpretation of results. Simple measures of health status, like self-rated health, although highly predictive of mortality and other health issues across a number of cultures (Chandola & Jenkinson, 2000; Idler & Benyamini, 1997), must be interpreted with caution among Somalis because of the tendency just mentioned. The survey data show that 15% of respondents reported fair or poor health, which is higher than some estimates for the general US population that put fair or poor health prevalence at less than 10%; however it is much lower

than some related socioeconomic groups, such as Americans with less than a high school education, whose low self-rated health prevalence exceeds 27% (Adams, Martinez, Vickerie, & Kirzinger, 2011). In addition, emotional health scales that ask Somalis to admit to stigmatized symptoms might result in underreporting.

### **Limitations**

The qualitative sample for this study was quite small, but did include representatives of various ages, genders, and amounts of time living in the US. However, because focus groups included only Somalis whose English ability was high, data were not directly obtained from those who lack English skills, who likely constitute at least half of the Somali population in Nashville. The small groups did provide a comfortable setting and participants seemed fairly open with their comments, but it is certainly possible that respondents were selective in what they chose to discuss or reveal to researchers.

The quantitative data were limited because of the measures available for use. At the time of study design, the researchers were unaware of a validated scale measuring acculturation for Somalis, and so proxy one-item measures were used. In addition, the measure of emotional status was lengthy and asked fairly personal questions; to the extent that respondents were reluctant to admit to having emotional symptoms, this may have been exacerbated even further by the necessity of using interpreters to assist in responding to the questionnaire (as large segments of Somalis are not literate, even in Somali). Other common proxy variables for acculturation, such as behavior scales, were unavailable in the survey questionnaire; and potentially important distinctions among social characteristics could not be made by the data (e.g., how many years of one's education took place in the home country v. the US). As mentioned previous, although the



IFH was used as a theoretical framework to guide the study, items or scales that tapped constructs beyond the individual level (such as family or community) were not included in the survey questionnaire, and thus unavailable for use in these analyses.

## **Conclusions and Implications**

Resettled refugees have taken diverse paths to arrive in the US and have diverse experiences once arrived. Despite this variation in circumstances, perceptions, and interpretations of their past and current experiences, some trends have emerged, and steps can be taken to try to alleviate some of the larger burdens.

First, resettled refugees may deal with serious distress from their socioeconomic circumstances or adjustment to a new culture, but may also lack systems for dealing with distress that had been in place in their countries of origin, such as extended family networks and other social support. One avenue of research is in developing and evaluating innovative interventions that aim to alleviate these burdens beyond the typical services provided by community-based organizations. Fostering social networks or community networks that can replace some of the instrumental and emotional support that was lost in transition could be one possibility.

Second, different ways of understanding health affect whether illness is recognized, as well as whether treatment is sought and the form that it takes. Ultimately, it is the individual's right to decide whether or not Westernized medical help is desired, but there are several fairly simple actions that could be taken. One is providing a detailed and accurate explanation of the American health care system to refugees upon arrival in this country via trusted community liaisons or leaders. Although refugees go through an extensive cultural orientation session prior to resettlement in the US, misperceptions about Westernized health care persist. On the other

hand, some fears, such that one will be treated through a cultural lens that may be inappropriate to them, may be well-founded. Health care professionals should be aware that Somali patients may have differing views about illness and may have reason to be hesitant to admit their symptoms; they should be trained to the highest possible standard in cultural competency.

Third, “acculturation” continues to be a contested and problematic construct. Clearly, there are changes and adjustments incumbent on any international migrant, and this adjustment is a phenomenon of potentially great importance to well-being. However, “acculturation” is not a singular thing – it is not unilinear or even bilinear – it is a term for a collection of complex cognitive, emotional, and social processes that one experiences as part of an attempt to adapt to and cope with a new setting. Refugees can take on or resist any of a number of behaviors, values, and identities related to the host culture or the heritage culture (or other cultures and subcultures), and each of these contains more complexity as well. Whatever it is about “acculturation” that is expected to affect health status—whether it be related distress, attitudes about adjustment, socioeconomic integration, or anything else—is what should be measured and included in studies as opposed to a singular proxy measure that supposedly represents it all. Even if studies were finding that time in the US or English ability had consistently positive or consistently negative relationships with health status (this is not the case), that information would still be of little use without an understanding of the mechanisms driving the relationship. Qualitative data can be especially useful in elucidating key mechanisms and pointing researchers toward future research possibilities, as well as generating culturally appropriate interventions. Quantitative data can also be of great use, but with clear theoretical foundations and clear explanations of what is being tested and why. Future studies should take care to consider other components and ecological levels from the IFH.

## CHAPTER V

### SUMMARY AND CONCLUSIONS

One's social and physical environment can be highly relevant to health status. Termed the "social determinants of health," these include an array of conditions, experiences, and statuses, that are influenced by the distribution of resources and power, both globally and locally (Wilkinson & Marmot, 2003). Some populations are of particular interest because of their disadvantaged status(es) in society, and for these groups a "social determinants of health" approach is particularly appropriate. Refugees are one such group – those who have fled their homes and resettled elsewhere, seeking safety from war or persecution. This dissertation sought to contribute to knowledge in two ways. The first was to provide an integrated model for the social determinants of health – a tool that can be used to organize what is already either theorized or known, and what is lacked, about the health of a population of interest. The second was to produce evidence about the health of one marginalized population – resettled refugees. The first chapter introduced an integrated framework for health (IFH) and applied it to resettled refugees. The second, third, and fourth chapters presented empirical studies that contributed to knowledge of refugee health status. This final chapter reviews the above, relating the chapters to each other and back to the IFH. Finally, implications for research and practice are offered.

#### **The Integrated Framework for Health and Resettled Refugees**

Founded upon existing representations of health processes that have been developed over the past several decades by other scholars (see chapter 1), the Integrated Framework for Health

(IFH) can be used to organize and assess the extant literature about a population of interest, and to conceptualize the interrelated components and variables that contribute to, and result from, health status. Four main components form the skeleton of the framework: (a) social characteristics (b) risks and protective factors (c) psychosocial resources and (d) health status. Each component spans multiple ecological levels: macrosystem, community, neighborhood, family, and individual. Key variables can be identified within each component and level that are relevant to a specific population of interest. Chapter 1 identified some of the factors that contribute to refugee health status (see Table 1.2) and provided a cursory overview of the literature available to understand the roles of these factors.

Although much research has been done with resettled refugees, gaps remain. The vast majority of research conducted with refugees is cross-sectional, with small and non-representative community samples, and with a heavy focus on the individual level. Research with other populations suggests that factors at broader ecological levels may be of importance, but there are few datasets available to explore such ideas with refugees. Several recommendations for future research were offered in Chapter 1. The first was to explore relationships beyond the individual level—looking into local contexts and family and community dynamics, as well as health care systems. Data for such research was not available for use in this dissertation. The second recommendation was to focus on a particular group of refugees and generate a more robust understanding among this sub-population, so that eventually comparisons can be made and important differentiators can be identified. The empirical chapters in this dissertation provided information about refugees from Somalia from three different angles (or series of research questions), including one chapter that compared them to refugees from Iraq. The third recommendation was to explore the complex relationships that exist between the many

contributors to health status for refugees, and explore longitudinal trends when possible. Chapter 2 involved an exploratory analysis of longitudinal trends in health status among two groups of refugees; Chapter 3 looked at relationships between variables from three different components of IFH (social characteristics, risks and protective factors, health status); Chapter 4 explored the complex dynamics involved in adjusting to a new culture from a qualitative perspective and compared this to some basic quantitative data.

### **Evidence Generated from Empirical Chapters**

Below appears a review the key evidence generated. It begins with acculturation because the information gleaned from the qualitative data help to contextualize the other results and conclusions.

#### **Acculturation as a Complex, Diverse, and Multifaceted Phenomenon**

Acculturation should be understood as a complex and multifaceted phenomenon, and the variation inherent in experiences of adjustment to a new culture should be recognized. Participants in qualitative study of Somali refugees living in Nashville, TN, described a wide variety of perceptions and interpretations of their circumstances and those of other Somalis. The link between acculturation and health is indirect and likely operates through multiple mediators; these intermediate relationships, in turn, may also be moderated by other factors. Given this, it is not surprising that the quantitative analysis using simply proxy variables to measure acculturation did not reveal linear relationships between acculturation and health status, and that results of other studies measuring acculturation in this way have not been uniform. Separate from the degree of acculturation experienced is the degree of distress generated by the process of

adaptation and adjustment. Many respondents spoke of distress arising from the transition to new circumstances, undesirable conditions in social or economic life that contrasted from their previous situation prior to resettlement, and chronic stressors resulting from lack of resources and outside pressures.

Another issue in the study of health status among Somalis, and that also directly relates to acculturation, is the way that health and illness are conceived. Focus group participants reported that a Somali conception of health as dichotomous instead of graded; that certain types of health issues are highly stigmatized and that certain symptom constellations constituting illness in a Westernized view are considered normal from a Somali view. Additionally, the decision to seek health care services and the reporting of symptoms or illnesses to health care professionals may be limited by misperceptions about the American health care system, or by fears arising from realistic concerns (a tendency for American psychiatrists to attempt to treat Somali mental illness with Westernized medicine, like psychotropic medications).

Despite being unable to contribute evidence toward a specific role for acculturation in health and illness, this analysis does support an argument for consideration of culture in health studies, especially those that involve self-ratings of health as opposed to direct observation by professionals or physiological testing. Respondents from different backgrounds with the same “objective” health status may nevertheless rate their health differently either because they view health and illness differently or because they are hesitant to report symptoms or problems.

### **Health Status Trends over Time**

Chapter 2 of this dissertation investigated changes in the self-rated emotional health status and physical health status over time for Somali and Iraqi refugees residing in the UK.

There were overall trends that differed by type of health assessed and by ethnic group. Because these analyses were exploratory, results should be interpreted with caution, but suggest that although physical and emotional health status may follow different trajectories over time, they are also related (e.g., emotional health status at the time of the asylum decision was positively correlated with physical health status at the same time, for both ethnic groups). Self-ratings of physical health were higher than those for emotional health, for both nationality groups. Another interesting finding was that demographic predictors of health status may have the same effects for both groups. Female sex and older age at time of asylum decision were associated with lower health status (both physical and emotional) at the time of asylum decision, while having lived in the UK for a year or more at that time was associated with higher health status. However, none were related to changes that occurred in health status over the study period (through 21 months after asylum decision). An obvious next step is to expand the list of predictors and to include time-varying covariates. Another critical exercise will be to tease out the mechanisms through which these predictors operate on health status; for example, why would time in the UK prior to the asylum decision confer a health advantage? It is important to establish that there are trends over time, but it would be of much practical use to elucidate what drives the trends.

### **Stressors and Health Status**

Previous studies have shown that refugees can be exposed to high numbers of stressors, and that these stressors are often associated with health status. Building on those results, Chapter 3 provided further evidence. Inventories of chronic and traumatic stressors showed that particular stressors were most prevalent for Somalis living in Nashville, TN. In addition, statistically significant relationships between exposure to both traumatic and chronic stressors and emotional

health, were present in these data, controlling for basic demographic characteristics. However, neither type of stressor was related to general self-rated health or to physical limitations on activity. Therefore, the nature of the health status assessed matters, and both chronic and traumatic stressors contribute to emotional health symptoms. In addition, the cutoff used to dichotomize the emotional symptoms scale into “high” and “low” made a marked difference in its relationship with the other variables. In light of the qualitative results from Chapter 4 in which Somalis reported a tendency to view health as dichotomous, setting a lower threshold for reporting makes sense—it distinguishes between those who have almost no symptoms, and those who have some or a lot. Not only is this a better match, conceptually, to the Somali way of viewing health status, but it also distinguishes between those who are willing to report any more than minimal symptoms and those who are not; reporting of emotional symptoms was another area of discussion among focus group respondents.

### **Evidence in the Context of the Integrated Framework for Health**

The research conducted for this dissertation contributes to the IFH in ways that cut across the four components and imply avenues for future research.

### **The Macrosystem**

Data from qualitative focus groups indirectly suggested that the macrosystem is relevant to the daily lives of resettled Somalis. Although there are numerous ways that the macrosystem might operate to affect the health of Somali refugees, two that relate to the data for this dissertation are culture and geopolitical events. *Cultural norms* and views form a context within which other factors more proximal to the individual will operate. As described elsewhere in this



dissertation, culture can influence conceptions of physical and mental health, stigma, tendencies toward or against care-seeking and reporting of illness, and strategies for coping with grief and illness. *Current geopolitical events* (specifically, the state of the Somali government and civil war) affect daily life conditions and on the experience of stressors. They bear upon the likelihood of return to one's homeland; concern over the experiences and opportunities had by family and friends still living in Somalia; and the burden to assist family and friends still living in Somalia. Many ties still exist to people currently living in Somalia, third countries, or refugee camps; and the lives led by Somalis who have been resettled to Nashville are affected by far more than their own localized circumstances. Indeed, a common theme that emerged in all focus group discussions was the expectation that they would support these ties financially. How much support is needed and the pressures felt by resettled refugees can depend on the state of world affairs, and how much support is expected can depend on cultural norms of reciprocity and financial and social connectedness.

A final note about the broad context of the macrosystem is urged by the national data from Chapter 2 comparing Iraqi and Somali health status trajectories. Although differences in the trajectories were partially explained by sociodemographic characteristics, differences in these characteristics at baseline indicate that some groups may be at higher risk than others. In addition, the fact that, on average, Iraqi health status changed little over the study period, while Somali health status increased to surpass that of Iraqis, is worthy of further explanation. Many potential explanations are possible – different resettlement programming and services, different experiences of stressors once resettled, differential willingness to report health problems, etc. – but many are likely affected by the macrosystem, at least indirectly in determining the social and economic contexts into which the refugees settled.

## Social Characteristics

The two quantitative chapters in this dissertation used sex, age, and education as the major social characteristics investigated, and the qualitative study touched on these as well in different ways. *Females* were far less likely than males to have completed a high school education in the community study of Somali refugees in Nashville. However, in controlled analyses using the same data, sex was not a significant predictor of any of the three types of health status investigated (self-rated health, physical limitations, emotional symptoms). In the final conditional growth curve model using data from Somali and Iraqi refugees living in the UK, male gender was predictive of better health (both physical and emotional) at baseline (time of asylum decision) for both ethnic groups. Respondents in qualitative focus groups suggested that females may have additional burdens (in comparison with men) because of their type of dress, limited access to physical activity, experiences of discrimination, and role in the family that might limit them to the household. In both quantitative chapters, older *age* was associated with worse general health status, and worse physical health status. In the Nashville community study, age was not a significant predictor of emotional symptoms, but in the larger UK study, older age was associated with worse emotional health, although the magnitude of the coefficient was approximately one-third of that when physical health status was regressed on age. Age was not discussed much in the qualitative data, except in the suggestion that younger Somalis might have an easier time or more willingness when adjusting to life in the US. In all controlled quantitative analyses, *education* did not have a significant relationship with health status, although it was very highly related to English ability in bivariate analysis, and was associated with increased exposure to both chronic and traumatic stressors in the Nashville community study. Education

was mentioned in the Nashville focus groups as a potentially stressful experience (that is, pursuing education in the US could be stressful due to difficulties with English).

In addition to the above social characteristics, participants in the focus groups mentioned a number of others. Some Somalis may have concerns over the status of jobs that they are pressured to take in the US that may not be commensurate with their education or experience. Many participants described a lack of financial resources that, coupled with intense demands from family outside of the US, lead to much distress. Minority statuses of several different types were mentioned – ethnic minority, religious minority, cultural minority, foreign-born. Each of these, and what these statuses mean in American society, was seen as contributing to distress for whoever mentioned them in the group. In this way, these characteristics also call to the community level – the localized context that bears upon what types of difference are stigmatized and discriminated against. The advantages of living near other Somalis were discussed in focus groups, including the availability of social support and comfort from being around co-ethnics; however, it was also mentioned that this could reduce opportunities to learn and practice English. To a similar point, some noted the difficulties in performing traditional social norms and supportive activities when living in more distant locations.

### **Risks and Protective Factors**

Chapter 3 addressed stressors at the individual level, showing that exposure to chronic and traumatic stressors were related to reporting higher emotional symptoms among Somalis in Nashville. Qualitative data touched on issues at the community level, as participants compared environments from their lives in Somalia to what they experienced in the US. Many noted feeling safer in the US, and that this is the main factor to their continued residence here. Some

expressed that this safety from violence, famine, and communicable disease makes them feel grateful and keeps them in good health, both physically and emotionally; while others noted that they feel greater stress from life in the US than they did in Somalia, even despite its dangers. A common assertion was that access to what respondents considered healthy foods (fresh, antibiotic free) was low in the US, and that the built environment and high reliance on vehicles reduced opportunities for physical activity, especially for women. Lack of safe and affordable housing was also mentioned as a difficulty, as well as limited access to health care, stemming from a lack of health insurance (as opposed to a lack of local providers or other reasons).

### **Psychosocial Resources**

The quantitative studies involved in this dissertation did not address psychosocial characteristics except the brief portion of Chapter 4 that dealt with quantitative proxies for acculturation. In this chapter, mixed methods data cast acculturation as a complex and dynamic process that varies across individuals. Acculturation and distress related to adjustment likely affect health status, but the mechanisms are unclear and further research is needed. Social support at the individual level was discussed as a thing of importance in traditional life and reduced in new life in the US. In addition, the capital embedded in social networks was a common theme of the focus groups as participants described extensive supportive networks that served as safety nets, present in their previous homes and lacking in their American lives.

### **Health status**

Efforts were made to include several different types of health status in analyses so that differences could be identified. Emotional health seemed to be much more related to exposure to

stressors than was general self-rated health or physical health. In both quantitative chapters, cross-sectional emotional health and physical health were related to each other, even after sociodemographic predictors or other covariates were included. Given that ratings for physical health were higher than those for emotional health among both groups of refugees in Chapter 2, this suggests that interventions or services that focus on emotional health should be given special attention for refugee groups.

### **Implications for Future Research**

Many studies of refugees have been undertaken, but much more research is needed. The main imperative at this point is to generate and utilize datasets that allow for additional types of analyses from what have already been conducted. However, such data are rare because collecting data with refugees is extremely difficult. Many refugees are mobile and hard to track over time. Many do not speak English and require interpretation that can be costly. Generating representative samples is impossible without a sampling frame from which to draw participants, and without this, the recruitment of respondents from diverse community locations is very time-intensive and requires a great deal of relationship-building and networking. Building trust from refugee respondents can also be challenging. Translating study materials takes time, is expensive, is ineffective if the respondent population speaks several different dialects that are not all considered, and is ineffective if the respondent population has low rates of literacy. These challenges make even small, local, cross-sectional studies difficult, let alone large, multi-site, or longitudinal studies. Below are several key areas for additional work that relate either to data production or research questions that could be answered with the types of data that are currently available.

## **Ecological Levels beyond the Individual**

Research is needed that specifically investigates the family-, neighborhood-, and community-levels. This can be done either with study questionnaires that target information about these levels, with qualitative interviews or focus groups that inquire about constructs at these levels, or with larger-scale datasets that involve either a few comparison cities for case studies, or that involve a large number of cities such that multilevel analyses could be undertaken. In addition, studies that involve multiple ethnic groups can shed light onto the types of issue common to certain groups, and help us to understand which factors operate primarily for individuals (for which ethnic group is less relevant) and which factors operate at a group-level.

## **Longitudinal Studies**

Longitudinal data from refugees would provide an opportunity to understand adjustment and transition over time. Ideally, refugees would be tracked for longer than just the initial year or two after resettlement, since it is possible that processes of adjustment take much longer to occur. As mentioned above, high-quality longitudinal data among this population may be too difficult to obtain, but if so, qualitative data that focuses on transitioning and on probing more about processes of adjustment and pathways through cultural transitions could be of use.

## **Literature Reviews**

There is a vast literature about refugees, covering, to varying extents, numerous of the elements within the IFH, but with different refugee groups, in different host countries, using different measures, and relating variables in different ways. A fairly straight-forward contribution to our knowledge about refugees would come from a consolidation of what has

already been studied, either for particular groups, particular categories of refugees, or in relation to particular predictors. Because health is related to so many different factors, research conducted under the auspices of other disciplines or focusing on characteristics or experiences that are not identified by the researchers as directly relating to health status (e.g., housing studies, employment studies) may still provide important evidence or contextual data that would contribute. In this undertaking it would also be important to include the many community needs assessments or unpublished studies conducted by local governments, human service organizations, or community-based organizations. In some cases these may be less rigorous than the academic literature; however, a great deal of community experience and context go into such reports, and identifying common problems and themes (e.g., service providers who work with the very large population of Somalis living in Minnesota may identify the same kinds of issues dealt with by those in the Somali communities of Ohio) can be of great benefit not only to researchers, but of course also to practitioners who serve these groups.

### **Culturally Validated Measures that Cover all IFH Components**

If working with quantitative data, using rigorously translated and culturally validated measures of each construct is important. If more of these were available, datasets would be able to explore many more variables and relationships. One specific variable of interest could come from scales for sub-components of acculturation processes. Not only should acculturation to and from the host and heritage cultures be thought of as separate processes, but each of these represents a latent construct that incorporates a number of different elements (e.g. behaviors, identity, values) and should be measured and modeled as such, rather than assuming that one or a few singular proxy variables can capture the entirety of acculturation. Certainly it is useful to

know whether or not there may be trends over time in refugee health status, but equating the passage of time with acculturation is an unfortunate misstep that some scholars continue to make.

In addition ways to effectively measure socioeconomic status, including income and occupational status (as well as a comparison of current occupation with education level and previous occupation in Somalia), would be useful, including meaningful ways of incorporating women's roles for those who are not employed for pay. Any measure of income would also need to account for the group of people supported by that income, which would include others in the household and especially others in Somalia or other countries to whom a respondent remits money. In addition, subjective social status and relative social status could be of importance – relating one's place in the social hierarchy to other Americans, to other Somalis in America, to one's own previous status when living in Somalia.

It is known that exposure to trauma and chronic stressors matter, so these should always be included in studies of refugee health. The next step is to examine interactions between exposure to these and potential moderators, like acculturation, coping strategies, or gender. With stressors and with health status, an effort must be made to encourage full and truthful reporting, either through enhanced trust with respondents or through indirect ways of asking about these concepts such that more accurate estimates can be derived.

### **Implications for Practice**

Although further research is warranted, there are certainly steps that practitioners in human service or health care service settings can take to serve resettled refugees more effectively.



## **Human Services**

Those who work in local government or in community-based organizations that serve refugees can work to design services or interventions that are tailored to the needs of various refugee groups. Somali refugees in our qualitative focus groups suggested a number of potential options for improvement in Nashville. A women's-only gym could be made available so that Muslim women have a place to exercise without worrying about the presence of men. A space for women to gather and socialize, such as a coffee shop, could be opened in an area of town with high concentrations of Somalis. Currently, two primarily Somali coffee shops exist in this area, but the space is dominated by men, and women may feel uncomfortable there. Women also suggested creating spaces and regular events that could serve a social function for youth, and spaces for young girls to be physically active as well. Additional classes for English-language learning could be made available, especially ones that are conveniently located in high-Somali neighborhoods so that transportation is not a barrier. Many respondents also spoke of a lack of health insurance or inadequate coverage by their current carriers. Although many refugees are employed, others may have trouble finding full-time work or jobs with health insurance benefits, and are therefore left in a vulnerable position. Even those who are employed, are often in jobs beneath their level of experience or education, and would benefit from additional employment-finding services. One participant argued strongly for the reunification of a Somali youth group that had dissolved several years prior; the group served a social function, but also contributed to education and leadership skills. Others suggested that housing be made available that is appropriate for Somali families, who are often larger than American families, so that Somalis can comfortably support the larger families. Beyond what was suggested by Somalis themselves, innovative social programming could be developed to help strengthen social connectedness and

reestablish social safety net systems that resettled refugees lack in their new locations. Somalis (and other refugee groups) are large enough in some localities to warrant needs assessments and specialized programming. This work is undoubtedly occurring in some places, and the results of such assessments and potentially evaluations of community interventions should be disseminated and summarized. It was not the role of this dissertation to review those materials, but it is likely that there is much to learn from what has already been implemented, and in collaborations between community organizations and local governments.

### **Health Care Services**

Several suggestions for health care service providers seem warranted. First, training health care professionals in cultural competence is of high importance. Providers should be sensitive to the specific needs of their patients and respectful of their perceptions and values. Second, ways of approaching certain populations in a culturally-competent way may require adjustments to typical procedures, and these should be accommodated. For example, one focus group respondent suggested that, in the case of addressing mental health issues, Somalis will be highly reluctant to discuss their traumatic experiences or emotional symptoms immediately. His recommendation was that doctors build the relationship with the patient slowly, earning trust, before attempting to push into topics that may be of great sensitivity to the patient. In addition, given the stigma against mental illness, co-locating services for mental health care with general health services could ease anxiety about reporting emotional symptoms and having to take on extra burdens or effort to seek additional services. Third, to whatever extent “traditional” or “Somali” ways of coping and treating illness can be supported or integrated with Western approaches, this could help to maintain a patient’s comfort and willingness to continue treatment.

Fourth, doctors should recognize that Somali patients may either lack information about their health history (coming from a place in which medical record-keeping is not typical) or may not want to divulge such information, even to a doctor. Furthermore, a tendency to compare one's own health status to the status of others who have worse conditions, can result in downplay of symptoms, leading to difficulties in diagnosis and treatment. Fifth, professional interpreters should be made available to assure understanding between doctor and patient, and to increase the probability of patient adherence to medication regimes or other treatments, once outside of the medical setting. Finally, Somalis (or other refugee groups) can be better informed about the American health care system, and the role of various types of services, doctors, medical records, and other aspects that are foreign to them.

### **Final Remarks**

Health status for any individual or group is dynamic, part of a complex system of experiences, conditions, and relationships that act together in obscure ways. This dissertation has contributed to understanding a small piece of this system for a particular population—resettled refugees—who may experience multiple types of disadvantage and have diverse needs. By contributing an integrated framework tool and applying it to this population, this work has summarized what is already known and the future directions that we should take, both in research and in practice.

## Appendix A

### **Mplus Input for All Model Comparisons**

#### ***IRAQI EMOTIONAL UNIVARIATE LGM***

---

Data:

File is "UKSNR.dat" ;

Variable:

Names are

ref somali male age45 age35 age25 nass partner parent uktime1 ed\_yrs7  
ed\_qual5 london relfrd0 relfrd3 eng\_tot0 eng\_tot3 unemp1 unemp2 unemp3  
finprb1 finprb2 finprb3 victim1 victim2 victim3 hlthtot0 hlthtot1  
hlthtot2 hlthtot3 phytot0 phytot1 phytot2 phytot3 emottot0 emottot1  
emottot2 emottot3 dropout1 dropout3 basewght weight1 weight2 weight3  
weightx1 weightx2 weightx3;

Missing are all (-9999) ;

Useobservations somali==0;

Usevariables are emottot0-emottot3;

Weight is basewght;

Analysis:

Estimator = mlr;

Coverage = .05;

#### **IRAQI EMOTIONAL A**

Model:

int\_e by emottot0@1 emottot1@1 emottot2@1 emottot3@1;  
linear\_e by emottot0@0 emottot1@0.667 emottot2@1.25 emottot3@1.75;  
emottot0-emottot3(1);  
[emottot0-emottot3@0];  
int\_e@0;  
linear\_e@0;  
[int\_e];  
[linear\_e];  
int\_e with linear\_e@0;

#### **IRAQI EMOTIONAL B**

Model:

int\_e by emottot0@1 emottot1@1 emottot2@1 emottot3@1;  
linear\_e by emottot0@0 emottot1@0.667 emottot2@1.25 emottot3@1.75;  
emottot0-emottot3(1);

[emottot0-emottot3@0];  
int\_e;  
linear\_e@0;  
[int\_e];  
[linear\_e];  
int\_e with linear\_e@0;

### **IRAQI EMOTIONAL C**

Model:

int\_e by emottot0@1 emottot1@1 emottot2@1 emottot3@1;  
linear\_e by emottot0@0 emottot1@0.667 emottot2@1.25 emottot3@1.75;  
emottot0-emottot3(1);  
[emottot0-emottot3@0];  
int\_e;  
linear\_e;  
[int\_e];  
[linear\_e];  
int\_e with linear\_e;

### **IRAQI EMOTIONAL D**

Model:

int\_e by emottot0@1 emottot1@1 emottot2@1 emottot3@1;  
linear\_e by emottot0@0 emottot1@0.667 emottot2@1.25 emottot3@1.75;  
emottot0-emottot3;  
[emottot0-emottot3@0];  
int\_e;  
linear\_e@0;  
[int\_e];  
[linear\_e];  
int\_e with linear\_e@0;

### **IRAQI EMOTIONAL E**

Model:

int\_e by emottot0@1 emottot1@1 emottot2@1 emottot3@1;  
linear\_e by emottot0@0 emottot1@0.667 emottot2@1.25 emottot3@1.75;  
quad\_e by emottot0@0 emottot1@0.4449 emottot2@1.5625 emottot3@3.0625;  
emottot0-emottot3(1);  
[emottot0-emottot3@0];  
int\_e;  
linear\_e@0;  
quad\_e@0;  
[int\_e];  
[linear\_e];

[quad\_e];  
int\_e with linear\_e@0;  
int\_e with quad\_e@0;  
linear\_e with quad\_e@0;

## **IRAQI EMOTIONAL F**

Model:

int\_e by emottot0@1 emottot1@1 emottot2@1 emottot3@1;  
shape\_e by emottot0@0 emottot1\* emottot2\* emottot3@1;  
emottot0-emottot3(1);  
[emottot0-emottot3@0];  
int\_e;  
shape\_e;  
[int\_e];  
[shape\_e];  
int\_e with shape\_e;

## **IRAQI EMOTIONAL CONDITIONAL**

Model:

int\_e by emottot0@1 emottot1@1 emottot2@1 emottot3@1;  
linear\_e by emottot0@0 emottot1@0.667 emottot2@1.25 emottot3@1.75;  
emottot0-emottot3 (1);  
[emottot0-emottot3@0];  
int\_e;  
linear\_e@0;  
[int\_e];  
[linear\_e];  
int\_e with linear\_e@0;  
int\_e on male;  
int\_e on age45;  
int\_e on ed\_yrs7;  
int\_e on uktime1;  
linear\_e on male;  
linear\_e on age45;  
linear\_e on ed\_yrs7;  
linear\_e on uktime1;

## ***SOMALI EMOTIONAL UNIVARIATE LGM***

---

Data:

File is "UKSNR.dat" ;

Variable:

Names are

```

ref somali male age45 age35 age25 nass partner parent uktime1 ed_yrs7
ed_qual5 london relfrd0 relfrd3 eng_tot0 eng_tot3 unemp1 unemp2 unemp3
finprb1 finprb2 finprb3 victim1 victim2 victim3 hlthtot0 hlthtot1
hlthtot2 hlthtot3 phytot0 phytot1 phytot2 phytot3 emottot0 emottot1
emottot2 emottot3 dropout1 dropout3 basewght weight1 weight2 weight3
weightx1 weightx2 weightx3;
Missing are all (-9999) ;
Useobservations somali==1;
Usevariables are emottot0-emottot3;
Weight is basewght;
Analysis:
Estimator = mlr;
Coverage = .05;

```

### **SOMALI EMOTIONAL A**

Model:

```

int_e by emottot0@1 emottot1@1 emottot2@1 emottot3@1;
linear_e by emottot0@0 emottot1@0.667 emottot2@1.25 emottot3@1.75;
emottot0-emottot3(1);
[emottot0-emottot3@0];
int_e@0;
linear_e@0;
[int_e];
[linear_e];
int_e with linear_e@0;

```

### **SOMALI EMOTIONAL B**

Model:

```

int_e by emottot0@1 emottot1@1 emottot2@1 emottot3@1;
linear_e by emottot0@0 emottot1@0.667 emottot2@1.25 emottot3@1.75;
emottot0-emottot3(1);
[emottot0-emottot3@0];
int_e;
linear_e@0;
[int_e];
[linear_e];
int_e with linear_e@0;

```

### **SOMALI EMOTIONAL C**

Model:

```

int_e by emottot0@1 emottot1@1 emottot2@1 emottot3@1;
linear_e by emottot0@0 emottot1@0.667 emottot2@1.25 emottot3@1.75;

```

emottot0-emottot3(1);  
[emottot0-emottot3@0];  
int\_e;  
linear\_e;  
[int\_e];  
[linear\_e];  
int\_e with linear\_e;

## **SOMALI EMOTIONAL D**

Model:

int\_e by emottot0@1 emottot1@1 emottot2@1 emottot3@1;  
linear\_e by emottot0@0 emottot1@0.667 emottot2@1.25 emottot3@1.75;  
emottot0-emottot3;  
[emottot0-emottot3@0];  
int\_e;  
linear\_e@0;  
[int\_e];  
[linear\_e];  
int\_e with linear\_e@0;

## **SOMALI EMOTIONAL E**

Model:

int\_e by emottot0@1 emottot1@1 emottot2@1 emottot3@1;  
linear\_e by emottot0@0 emottot1@0.667 emottot2@1.25 emottot3@1.75;  
quad\_e by emottot0@0 emottot1@0.4449 emottot2@1.5625 emottot3@3.0625;  
emottot0-emottot3(1);  
[emottot0-emottot3@0];  
int\_e;  
linear\_e@0;  
quad\_e@0;  
[int\_e];  
[linear\_e];  
[quad\_e];  
int\_e with linear\_e@0;  
int\_e with quad\_e@0;  
linear\_e with quad\_e@0;

## **SOMALI EMOTIONAL F**

Model:

int\_e by emottot0@1 emottot1@1 emottot2@1 emottot3@1;  
shape\_e by emottot0@0 emottot1\* emottot2\* emottot3@1;  
emottot0-emottot3(1);  
[emottot0-emottot3@0];



```
int_e;  
shape_e;  
[int_e];  
[shape_e];  
int_e with shape_e;
```

## **SOMALI EMOTIONAL CONDITIONAL**

Model:

```
int_e by emottot0@1 emottot1@1 emottot2@1 emottot3@1;  
linear_e by emottot0@0 emottot1@0.667 emottot2@1.25 emottot3@1.75;  
emottot0-emottot3 (1);  
[emottot0-emottot3@0];  
int_e;  
linear_e@0;  
[int_e];  
[linear_e];  
int_e with linear_e@0;  
int_e on male;  
int_e on age45;  
int_e on ed_yrs7;  
int_e on uktime1;  
linear_e on male;  
linear_e on age45;  
linear_e on ed_yrs7;  
linear_e on uktime1;
```

## ***IRAQI PHYSICAL UNIVARIATE LGM***

---

Data:

File is "UKSNR.dat" ;

Variable:

Names are

```
ref somali male age45 age35 age25 nass partner parent uktime1 ed_yrs7  
ed_equals london relfrd0 relfrd3 eng_tot0 eng_tot3 unemp1 unemp2 unemp3  
finprb1 finprb2 finprb3 victim1 victim2 victim3 hlthtot0 hlthtot1  
hlthtot2 hlthtot3 phytot0 phytot1 phytot2 phytot3 emottot0 emottot1  
emottot2 emottot3 dropout1 dropout3 basewght weight1 weight2 weight3  
weightx1 weightx2 weightx3;
```

Missing are all (-9999) ;

Useobservations somali==0;

Usevariables are phytot0-phytot3;

Weight is basewght;

Analysis:

Estimator = mlr;

Coverage = .05;

### **IRAQI PHYSICAL A**

Model:

```
int_p by phytot0@1 phytot1@1 phytot2@1 phytot3@1;  
linear_p by phytot0@0 phytot1@0.667 phytot2@1.25 phytot3@1.75;  
phytot0-phytot3(1);  
[phytot0-phytot3@0];  
int_p@0;  
linear_p@0;  
[int_p];  
[linear_p];  
int_p with linear_p@0;
```

### **IRAQI PHYSICAL B**

Model:

```
int_p by phytot0@1 phytot1@1 phytot2@1 phytot3@1;  
linear_p by phytot0@0 phytot1@0.667 phytot2@1.25 phytot3@1.75;  
phytot0-phytot3(1);  
[phytot0-phytot3@0];  
int_p;  
linear_p@0;  
[int_p];  
[linear_p];  
int_p with linear_p@0;
```

### **IRAQI PHYSICAL C**

Model:

```
int_p by phytot0@1 phytot1@1 phytot2@1 phytot3@1;  
linear_p by phytot0@0 phytot1@0.667 phytot2@1.25 phytot3@1.75;  
phytot0-phytot3(1);  
[phytot0-phytot3@0];  
int_p;  
linear_p;  
[int_p];  
[linear_p];  
int_p with linear_p;
```

### **IRAQI PHYSICAL D**

Model:

```
int_p by phytot0@1 phytot1@1 phytot2@1 phytot3@1;  
linear_p by phytot0@0 phytot1@0.667 phytot2@1.25 phytot3@1.75;
```

phytot0-phytot3;  
[phytot0-phytot3@0];  
int\_p;  
linear\_p;  
[int\_p];  
[linear\_p];  
int\_p with linear\_p;

## **IRAQI PHYSICAL E**

Model:

int\_p by phytot0@1 phytot1@1 phytot2@1 phytot3@1;  
linear\_p by phytot0@0 phytot1@0.667 phytot2@1.25 phytot3@1.75;  
quad\_p by phytot0@0 phytot1@0.4449 phytot2@1.5625 phytot3@3.0625;  
phytot0-phytot3;  
[phytot0-phytot3@0];  
int\_p;  
linear\_p;  
[int\_p];  
[linear\_p];  
int\_p with linear\_p;  
[quad\_p];  
quad\_p@0;  
int\_p with quad\_p@0;  
linear\_p with quad\_p@0;

## **IRAQI PHYSICAL F**

Model:

int\_p by phytot0@1 phytot1@1 phytot2@1 phytot3@1;  
shape\_p by phytot0@0 phytot1\* phytot2\* phytot3@1;  
phytot0-phytot3;  
[phytot0-phytot3@0];  
int\_p;  
shape\_p;  
[int\_p];  
[shape\_p];  
int\_p with shape\_p;

## **IRAQI PHYSICAL CONDITIONAL**

Model:

int\_p by phytot0@1 phytot1@1 phytot2@1 phytot3@1;  
linear\_p by phytot0@0 phytot1@0.667 phytot2@1.25 phytot3@1.75;  
phytot0-phytot3;  
[phytot0-phytot3@0];

```
int_p;  
linear_p;  
[int_p];  
[linear_p];  
int_p with linear_p;  
int_p on male;  
int_p on age45;  
int_p on ed_yrs7;  
int_p on uktime1;  
linear_p on male;  
linear_p on age45;  
linear_p on ed_yrs7;  
linear_p on uktime1;
```

### ***SOMALI PHYSICAL UNIVARIATE LGM***

---

Data:

File is "UKSNR.dat" ;

Variable:

Names are

```
ref somali male age45 age35 age25 nass partner parent uktime1 ed_yrs7  
ed_equals london relfrd0 relfrd3 eng_tot0 eng_tot3 unemp1 unemp2 unemp3  
finprb1 finprb2 finprb3 victim1 victim2 victim3 hlthtot0 hlthtot1  
hlthtot2 hlthtot3 phytot0 phytot1 phytot2 phytot3 emottot0 emottot1  
emottot2 emottot3 dropout1 dropout3 basewght weight1 weight2 weight3  
weightx1 weightx2 weightx3;
```

Missing are all (-9999) ;

Useobservations somali==1;

Usevariables are phytot0-phytot3;

Weight is basewght;

Analysis:

Estimator = mlr;

Coverage = .05;

### **SOMALI PHYSICAL A**

Model:

```
int_p by phytot0@1 phytot1@1 phytot2@1 phytot3@1;  
linear_p by phytot0@0 phytot1@0.667 phytot2@1.25 phytot3@1.75;  
phytot0-phytot3(1);  
[phytot0-phytot3@0];  
int_p@0;  
linear_p@0;  
[int_p];  
[linear_p];
```

int\_p with linear\_p@0;

### **SOMALI PHYSICAL B**

Model:

int\_p by phytot0@1 phytot1@1 phytot2@1 phytot3@1;  
linear\_p by phytot0@0 phytot1@0.667 phytot2@1.25 phytot3@1.75;  
phytot0-phytot3(1);  
[phytot0-phytot3@0];  
int\_p;  
linear\_p@0;  
[int\_p];  
[linear\_p];  
int\_p with linear\_p@0;

### **SOMALI PHYSICAL C**

Model:

int\_p by phytot0@1 phytot1@1 phytot2@1 phytot3@1;  
linear\_p by phytot0@0 phytot1@0.667 phytot2@1.25 phytot3@1.75;  
phytot0-phytot3(1);  
[phytot0-phytot3@0];  
int\_p;  
linear\_p;  
[int\_p];  
[linear\_p];  
int\_p with linear\_p;

### **SOMALI PHYSICAL D**

Model:

int\_p by phytot0@1 phytot1@1 phytot2@1 phytot3@1;  
linear\_p by phytot0@0 phytot1@0.667 phytot2@1.25 phytot3@1.75;  
phytot0-phytot3;  
[phytot0-phytot3@0];  
int\_p;  
linear\_p;  
[int\_p];  
[linear\_p];  
int\_p with linear\_p;

### **SOMALI PHYSICAL E**

Model:

int\_p by phytot0@1 phytot1@1 phytot2@1 phytot3@1;  
linear\_p by phytot0@0 phytot1@0.667 phytot2@1.25 phytot3@1.75;

quad\_p by phytot0@0 phytot1@0.4449 phytot2@1.5625 phytot3@3.0625;  
phytot0-phytot3;  
[phytot0-phytot3@0];  
int\_p;  
linear\_p;  
[int\_p];  
[linear\_p];  
int\_p with linear\_p;  
[quad\_p];  
quad\_p@0;  
int\_p with quad\_p@0;  
linear\_p with quad\_p@0;

## **SOMALI PHYSICAL F**

Model:

int\_p by phytot0@1 phytot1@1 phytot2@1 phytot3@1;  
shape\_p by phytot0@0 phytot1\* phytot2\* phytot3@1;  
phytot0-phytot3;  
[phytot0-phytot3@0];  
int\_p;  
shape\_p;  
[int\_p];  
[shape\_p];  
int\_p with shape\_p;

## **SOMALI PHYSICAL CONDITIONAL**

Model:

int\_p by phytot0@1 phytot1@1 phytot2@1 phytot3@1;  
linear\_p by phytot0@0 phytot1@0.667 phytot2@1.25 phytot3@1.75;  
phytot0-phytot3;  
[phytot0-phytot3@0];  
int\_p;  
linear\_p;  
[int\_p];  
[linear\_p];  
int\_p with linear\_p;  
int\_p on male;  
int\_p on age45;  
int\_p on ed\_yrs7;  
int\_p on uktime1;  
linear\_p on male;  
linear\_p on age45;  
linear\_p on ed\_yrs7;  
linear\_p on uktime1;

## ***IRAQI MULTIVARIATE LGM***

---

Data:

File is "UKSNR.dat" ;

Variable:

Names are

ref somali male age45 age35 age25 nass partner parent uktime1 ed\_yrs7  
ed\_qual5 london relfrd0 relfrd3 eng\_tot0 eng\_tot3 unemp1 unemp2 unemp3  
finprb1 finprb2 finprb3 victim1 victim2 victim3 hlthtot0 hlthtot1  
hlthtot2 hlthtot3 phytot0 phytot1 phytot2 phytot3 emottot0 emottot1  
emottot2 emottot3 dropout1 dropout3 basewght weight1 weight2 weight3  
weightx1 weightx2 weightx3;

Missing are all (-9999) ;

Useobservations somali==0;

Usevariables are emottot0-emottot3 phytot0-phytot3;

Weight is basewght;

Analysis:

Estimator = mlr;

Coverage = .05;

## **IRAQI MULTIVARIATE A**

Model:

int\_e by emottot0@1 emottot1@1 emottot2@1 emottot3@1;  
linear\_e by emottot0@0 emottot1@0.667 emottot2@1.25 emottot3@1.75;  
emottot0-emottot3 (1);  
[emottot0-emottot3@0];  
int\_e;  
linear\_e@0;  
[int\_e];  
[linear\_e];  
int\_e with linear\_e@0;

int\_p by phytot0@1 phytot1@1 phytot2@1 phytot3@1;  
linear\_p by phytot0@0 phytot1@0.667 phytot2@1.25 phytot3@1.75;  
phytot0-phytot3;  
[phytot0-phytot3@0];  
int\_p;  
linear\_p;  
[int\_p];  
[linear\_p];  
int\_p with linear\_p;

int\_e with int\_p@0;

int\_e with linear\_p@0;  
linear\_e with int\_p@0;  
linear\_e with linear\_p@0;

## **IRAQI MULTIVARIATE B**

Model:

int\_e by emottot0@1 emottot1@1 emottot2@1 emottot3@1;  
linear\_e by emottot0@0 emottot1@0.667 emottot2@1.25 emottot3@1.75;  
emottot0-emottot3 (1);  
[emottot0-emottot3@0];  
int\_e;  
linear\_e@0;  
[int\_e];  
[linear\_e];  
int\_e with linear\_e@0;

int\_p by phytot0@1 phytot1@1 phytot2@1 phytot3@1;  
linear\_p by phytot0@0 phytot1@0.667 phytot2@1.25 phytot3@1.75;  
phytot0-phytot3;  
[phytot0-phytot3@0];  
int\_p;  
linear\_p;  
[int\_p];  
[linear\_p];  
int\_p with linear\_p;

int\_e with int\_p;  
int\_e with linear\_p@0;  
linear\_e with int\_p@0;  
linear\_e with linear\_p@0;

## **IRAQI MULTIVARIATE C**

Model:

int\_e by emottot0@1 emottot1@1 emottot2@1 emottot3@1;  
linear\_e by emottot0@0 emottot1@0.667 emottot2@1.25 emottot3@1.75;  
emottot0-emottot3 (1);  
[emottot0-emottot3@0];  
int\_e;  
linear\_e@0;  
[int\_e];  
[linear\_e];  
int\_e with linear\_e@0;

int\_p by phytot0@1 phytot1@1 phytot2@1 phytot3@1;



linear\_p by phytot0@0 phytot1@0.667 phytot2@1.25 phytot3@1.75;  
phytot0-phytot3;  
[phytot0-phytot3@0];  
int\_p;  
linear\_p;  
[int\_p];  
[linear\_p];  
int\_p with linear\_p;

int\_e with int\_p;  
int\_e with linear\_p;  
linear\_e with int\_p@0;  
linear\_e with linear\_p@0;

## IRAQI MULTIVARIATE D

Model:

int\_e by emottot0@1 emottot1@1 emottot2@1 emottot3@1;  
linear\_e by emottot0@0 emottot1@0.667 emottot2@1.25 emottot3@1.75;  
emottot0-emottot3 (1);  
[emottot0-emottot3@0];  
int\_e;  
linear\_e@0;  
[int\_e];  
[linear\_e];  
int\_e with linear\_e@0;

int\_p by phytot0@1 phytot1@1 phytot2@1 phytot3@1;  
linear\_p by phytot0@0 phytot1@0.667 phytot2@1.25 phytot3@1.75;  
phytot0-phytot3;  
[phytot0-phytot3@0];  
int\_p;  
linear\_p;  
[int\_p];  
[linear\_p];  
int\_p with linear\_p;

int\_e with int\_p;  
int\_e with linear\_p@0;  
linear\_e with int\_p@0;  
linear\_e with linear\_p@0;

emottot0 with phytot0 (2);  
emottot1 with phytot1 (2);  
emottot2 with phytot2 (2);  
emottot3 with phytot3 (2);

## IRAQI MULTIVARIATE E

Model:

```
int_e by emottot0@1 emottot1@1 emottot2@1 emottot3@1;  
linear_e by emottot0@0 emottot1@0.667 emottot2@1.25 emottot3@1.75;  
emottot0-emottot3 (1);  
[emottot0-emottot3@0];  
int_e;  
linear_e@0;  
[int_e];  
[linear_e];  
int_e with linear_e@0;
```

```
int_p by phytot0@1 phytot1@1 phytot2@1 phytot3@1;  
linear_p by phytot0@0 phytot1@0.667 phytot2@1.25 phytot3@1.75;  
phytot0-phytot3;  
[phytot0-phytot3@0];  
int_p;  
linear_p;  
[int_p];  
[linear_p];  
int_p with linear_p;
```

```
int_e with int_p;  
int_e with linear_p@0;  
linear_e with int_p@0;  
linear_e with linear_p@0;
```

```
emottot0 with phytot0;  
emottot1 with phytot1;  
emottot2 with phytot2;  
emottot3 with phytot3;
```

## IRAQI MULTIVARIATE F

Model:

```
int_e by emottot0@1 emottot1@1 emottot2@1 emottot3@1;  
linear_e by emottot0@0 emottot1@0.667 emottot2@1.25 emottot3@1.75;  
emottot0-emottot3 (1);  
[emottot0-emottot3@0];  
int_e ;  
linear_e@0;  
[int_e] (2);  
[linear_e] (3);  
int_e with linear_e@0;
```

```
int_p by phytot0@1 phytot1@1 phytot2@1 phytot3@1;
linear_p by phytot0@0 phytot1@0.667 phytot2@1.25 phytot3@1.75;
phytot0-phytot3;
[phytot0-phytot3@0];
int_p;
linear_p;
[int_p] (2);
[linear_p] (3);
int_p with linear_p;
```

```
int_e with int_p;
int_e with linear_p@0;
linear_e with int_p@0;
linear_e with linear_p@0;
```

```
emottot0 with phytot0;
emottot1 with phytot1;
emottot2 with phytot2;
emottot3 with phytot3;
```

### ***SOMALI MULTIVARIATE LGM***

---

#### Data:

File is "UKSNR.dat" ;

#### Variable:

Names are

```
ref somali male age45 age35 age25 nass partner parent uktime1 ed_yrs7
ed_qual5 london relfrd0 relfrd3 eng_tot0 eng_tot3 unemp1 unemp2 unemp3
finprb1 finprb2 finprb3 victim1 victim2 victim3 hlthtot0 hlthtot1
hlthtot2 hlthtot3 phytot0 phytot1 phytot2 phytot3 emottot0 emottot1
emottot2 emottot3 dropout1 dropout3 basewght weight1 weight2 weight3
weightx1 weightx2 weightx3;
```

Missing are all (-9999) ;

Useobservations somali==1;

Usevariables are emottot0-emottot3 phytot0-phytot3;

Weight is basewght;

#### Analysis:

Estimator = mlr;

Coverage = .05;

### **SOMALI MULTIVARIATE A**

#### Model:

```
int_e by emottot0@1 emottot1@1 emottot2@1 emottot3@1;
```

linear\_e by emottot0@0 emottot1@0.667 emottot2@1.25 emottot3@1.75;  
emottot0-emottot3 (1);  
[emottot0-emottot3@0];  
int\_e;  
linear\_e@0;  
[int\_e];  
[linear\_e];  
int\_e with linear\_e@0;

int\_p by phytot0@1 phytot1@1 phytot2@1 phytot3@1;  
linear\_p by phytot0@0 phytot1@0.667 phytot2@1.25 phytot3@1.75;  
phytot0-phytot3;  
[phytot0-phytot3@0];  
int\_p;  
linear\_p;  
[int\_p];  
[linear\_p];  
int\_p with linear\_p;

int\_e with int\_p@0;  
int\_e with linear\_p@0;  
linear\_e with int\_p@0;  
linear\_e with linear\_p@0;

## **SOMALI MULTIVARIATE B**

Model:

int\_e by emottot0@1 emottot1@1 emottot2@1 emottot3@1;  
linear\_e by emottot0@0 emottot1@0.667 emottot2@1.25 emottot3@1.75;  
emottot0-emottot3 (1);  
[emottot0-emottot3@0];  
int\_e;  
linear\_e@0;  
[int\_e];  
[linear\_e];  
int\_e with linear\_e@0;

int\_p by phytot0@1 phytot1@1 phytot2@1 phytot3@1;  
linear\_p by phytot0@0 phytot1@0.667 phytot2@1.25 phytot3@1.75;  
phytot0-phytot3;  
[phytot0-phytot3@0];  
int\_p;  
linear\_p;  
[int\_p];  
[linear\_p];  
int\_p with linear\_p;

int\_e with int\_p;  
int\_e with linear\_p@0;  
linear\_e with int\_p@0;  
linear\_e with linear\_p@0;

## SOMALI MULTIVARIATE C

Model:

int\_e by emottot0@1 emottot1@1 emottot2@1 emottot3@1;  
linear\_e by emottot0@0 emottot1@0.667 emottot2@1.25 emottot3@1.75;  
emottot0-emottot3 (1);  
[emottot0-emottot3@0];  
int\_e;  
linear\_e@0;  
[int\_e];  
[linear\_e];  
int\_e with linear\_e@0;

int\_p by phytot0@1 phytot1@1 phytot2@1 phytot3@1;  
linear\_p by phytot0@0 phytot1@0.667 phytot2@1.25 phytot3@1.75;  
phytot0-phytot3;  
[phytot0-phytot3@0];  
int\_p;  
linear\_p;  
[int\_p];  
[linear\_p];  
int\_p with linear\_p;

int\_e with int\_p;  
int\_e with linear\_p;  
linear\_e with int\_p@0;  
linear\_e with linear\_p@0;

## SOMALI MULTIVARIATE D

Model:

int\_e by emottot0@1 emottot1@1 emottot2@1 emottot3@1;  
linear\_e by emottot0@0 emottot1@0.667 emottot2@1.25 emottot3@1.75;  
emottot0-emottot3 (1);  
[emottot0-emottot3@0];  
int\_e;  
linear\_e@0;  
[int\_e];  
[linear\_e];  
int\_e with linear\_e@0;

int\_p by phytot0@1 phytot1@1 phytot2@1 phytot3@1;  
linear\_p by phytot0@0 phytot1@0.667 phytot2@1.25 phytot3@1.75;  
phytot0-phytot3;  
[phytot0-phytot3@0];  
int\_p;  
linear\_p;  
[int\_p];  
[linear\_p];  
int\_p with linear\_p;

int\_e with int\_p;  
int\_e with linear\_p@0;  
linear\_e with int\_p@0;  
linear\_e with linear\_p@0;

emottot0 with phytot0 (2);  
emottot1 with phytot1 (2);  
emottot2 with phytot2 (2);  
emottot3 with phytot3 (2);

## **SOMALI MULTIVARIATE E**

Model:

int\_e by emottot0@1 emottot1@1 emottot2@1 emottot3@1;  
linear\_e by emottot0@0 emottot1@0.667 emottot2@1.25 emottot3@1.75;  
emottot0-emottot3 (1);  
[emottot0-emottot3@0];  
int\_e;  
linear\_e@0;  
[int\_e];  
[linear\_e];  
int\_e with linear\_e@0;

int\_p by phytot0@1 phytot1@1 phytot2@1 phytot3@1;  
linear\_p by phytot0@0 phytot1@0.667 phytot2@1.25 phytot3@1.75;  
phytot0-phytot3;  
[phytot0-phytot3@0];  
int\_p;  
linear\_p;  
[int\_p];  
[linear\_p];  
int\_p with linear\_p;

int\_e with int\_p;  
int\_e with linear\_p@0;

linear\_e with int\_p@0;  
linear\_e with linear\_p@0;

emottot0 with phytot0;  
emottot1 with phytot1;  
emottot2 with phytot2;  
emottot3 with phytot3;

## **SOMALI MULTIVARIATE F**

Model:

int\_e by emottot0@1 emottot1@1 emottot2@1 emottot3@1;  
linear\_e by emottot0@0 emottot1@0.667 emottot2@1.25 emottot3@1.75;  
emottot0-emottot3 (1);  
[emottot0-emottot3@0];  
int\_e;  
linear\_e@0;  
[int\_e](2);  
[linear\_e](3);  
int\_e with linear\_e@0;

int\_p by phytot0@1 phytot1@1 phytot2@1 phytot3@1;  
linear\_p by phytot0@0 phytot1@0.667 phytot2@1.25 phytot3@1.75;  
phytot0-phytot3;  
[phytot0-phytot3@0];  
int\_p;  
linear\_p;  
[int\_p](2);  
[linear\_p](3);  
int\_p with linear\_p;

int\_e with int\_p;  
int\_e with linear\_p@0;  
linear\_e with int\_p@0;  
linear\_e with linear\_p@0;

emottot0 with phytot0;  
emottot1 with phytot1;  
emottot2 with phytot2;  
emottot3 with phytot3;

## ***MULTIPLE GROUP MULTIVARIATE LGM***

---

Data:

File is "UKSNR.dat" ;

Variable:

Names are

ref somali male age45 age35 age25 nass partner parent uktime1 ed\_yrs7  
ed\_qual5 london relfrd0 relfrd3 eng\_tot0 eng\_tot3 unemp1 unemp2 unemp3  
finprb1 finprb2 finprb3 victim1 victim2 victim3 hlthtot0 hlthtot1  
hlthtot2 hlthtot3 phytot0 phytot1 phytot2 phytot3 emottot0 emottot1  
emottot2 emottot3 dropout1 dropout3 basewght weight1 weight2 weight3  
weightx1 weightx2 weightx3;

Missing are all (-9999) ;

Usevariables are emottot0-emottot3 phytot0-phytot3;

Weight is basewght;

Grouping is somali(0=iraqi 1=somali);

Analysis:

Estimator = mlr;

Coverage = .05;

## MULTIGROUP MULTIVARIATE A

Model:

int\_e by emottot0@1 emottot1@1 emottot2@1 emottot3@1;  
linear\_e by emottot0@0 emottot1@0.667 emottot2@1.25 emottot3@1.75;  
emottot0-emottot3 (1);  
[emottot0-emottot3@0];  
int\_e ;  
linear\_e@0;  
[int\_e];  
[linear\_e];  
int\_e with linear\_e@0;

int\_p by phytot0@1 phytot1@1 phytot2@1 phytot3@1;  
linear\_p by phytot0@0 phytot1@0.667 phytot2@1.25 phytot3@1.75;  
phytot0-phytot3;  
[phytot0-phytot3@0];  
int\_p;  
linear\_p;  
[int\_p];  
[linear\_p];  
int\_p with linear\_p;

int\_e with int\_p;  
int\_e with linear\_p@0;  
linear\_e with int\_p@0;  
linear\_e with linear\_p@0;

emottot0 with phytot0;  
emottot1 with phytot1;



emottot2 with phytot2;  
emottot3 with phytot3;

Model iraqi:

emottot0-emottot3 (2);  
int\_e ;  
linear\_e@0;  
[int\_e];  
[linear\_e];  
int\_e with linear\_e@0;

phytot0-phytot3;  
int\_p;  
linear\_p;  
[int\_p];  
[linear\_p];  
int\_p with linear\_p;

int\_e with int\_p;  
int\_e with linear\_p@0;  
linear\_e with int\_p@0;  
linear\_e with linear\_p@0;

emottot0 with phytot0;  
emottot1 with phytot1;  
emottot2 with phytot2;  
emottot3 with phytot3;

## MULTIGROUP MULTIVARIATE B

Model:

int\_e by emottot0@1 emottot1@1 emottot2@1 emottot3@1;  
linear\_e by emottot0@0 emottot1@0.667 emottot2@1.25 emottot3@1.75;  
emottot0-emottot3 (1);  
[emottot0-emottot3@0];  
int\_e ;  
linear\_e@0;  
[int\_e](11);  
[linear\_e](12);  
int\_e with linear\_e@0;

int\_p by phytot0@1 phytot1@1 phytot2@1 phytot3@1;  
linear\_p by phytot0@0 phytot1@0.667 phytot2@1.25 phytot3@1.75;  
phytot0-phytot3;  
[phytot0-phytot3@0];  
int\_p;

linear\_p;  
[int\_p](13);  
[linear\_p](14);  
int\_p with linear\_p;

int\_e with int\_p;  
int\_e with linear\_p@0;  
linear\_e with int\_p@0;  
linear\_e with linear\_p@0;

emottot0 with phytot0;  
emottot1 with phytot1;  
emottot2 with phytot2;  
emottot3 with phytot3;

Model iraqi:  
emottot0-emottot3 (2);  
int\_e ;  
linear\_e@0;  
[int\_e](11);  
[linear\_e](12);  
int\_e with linear\_e@0;

phytot0-phytot3;  
int\_p;  
linear\_p;  
[int\_p](13);  
[linear\_p](14);  
int\_p with linear\_p;

int\_e with int\_p;  
int\_e with linear\_p@0;  
linear\_e with int\_p@0;  
linear\_e with linear\_p@0;

emottot0 with phytot0;  
emottot1 with phytot1;  
emottot2 with phytot2;  
emottot3 with phytot3;

## MULTIGROUP MULTIVARIATE C

Model:  
int\_e by emottot0@1 emottot1@1 emottot2@1 emottot3@1;  
linear\_e by emottot0@0 emottot1@0.667 emottot2@1.25 emottot3@1.75;  
emottot0-emottot3 (1);

[emottot0-emottot3@0];  
int\_e (11);  
linear\_e@0;  
[int\_e];  
[linear\_e];  
int\_e with linear\_e@0;

int\_p by phytot0@1 phytot1@1 phytot2@1 phytot3@1;  
linear\_p by phytot0@0 phytot1@0.667 phytot2@1.25 phytot3@1.75;  
phytot0-phytot3;  
[phytot0-phytot3@0];  
int\_p (12);  
linear\_p (13);  
[int\_p];  
[linear\_p];  
int\_p with linear\_p (14);

int\_e with int\_p (15);  
int\_e with linear\_p@0;  
linear\_e with int\_p@0;  
linear\_e with linear\_p@0;

emottot0 with phytot0;  
emottot1 with phytot1;  
emottot2 with phytot2;  
emottot3 with phytot3;

Model iraqi:

emottot0-emottot3 (2);  
int\_e (11);  
linear\_e@0;  
[int\_e];  
[linear\_e];  
int\_e with linear\_e@0;

phytot0-phytot3;  
int\_p (12);  
linear\_p (13);  
[int\_p];  
[linear\_p];  
int\_p with linear\_p (14);

int\_e with int\_p (15);  
int\_e with linear\_p@0;  
linear\_e with int\_p@0;  
linear\_e with linear\_p@0;

emottot0 with phytot0;  
emottot1 with phytot1;  
emottot2 with phytot2;  
emottot3 with phytot3;

## MULTIGROUP MULTIVARIATE D

Model:

int\_e by emottot0@1 emottot1@1 emottot2@1 emottot3@1;  
linear\_e by emottot0@0 emottot1@0.667 emottot2@1.25 emottot3@1.75;  
emottot0-emottot3 (1);  
[emottot0-emottot3@0];  
int\_e (11);  
linear\_e@0;  
[int\_e];  
[linear\_e];  
int\_e with linear\_e@0;

int\_p by phytot0@1 phytot1@1 phytot2@1 phytot3@1;  
linear\_p by phytot0@0 phytot1@0.667 phytot2@1.25 phytot3@1.75;  
phytot0-phytot3;  
[phytot0-phytot3@0];  
int\_p (12);  
linear\_p (13);  
[int\_p];  
[linear\_p];  
int\_p with linear\_p (14);

int\_e with int\_p (15);  
int\_e with linear\_p@0;  
linear\_e with int\_p@0;  
linear\_e with linear\_p@0;

emottot0 with phytot0 (21);  
emottot1 with phytot1 (22);  
emottot2 with phytot2 (23);  
emottot3 with phytot3 (24);

Model iraqi:

emottot0-emottot3 (1);  
int\_e (11);  
linear\_e@0;  
[int\_e];  
[linear\_e];  
int\_e with linear\_e@0;

phytot0-phytot3;  
int\_p (12);  
linear\_p (13);  
[int\_p];  
[linear\_p];  
int\_p with linear\_p (14);

int\_e with int\_p (15);  
int\_e with linear\_p@0;  
linear\_e with int\_p@0;  
linear\_e with linear\_p@0;

emottot0 with phytot0 (21);  
emottot1 with phytot1 (22);  
emottot2 with phytot2 (23);  
emottot3 with phytot3 (24);

### ***MULTIPLE GROUP MULTIVARIATE CONDITIONAL LGMS***

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#### **MULTIGROUP MULTIVARIATE CONDITIONAL A**

Model:

int\_e by emottot0@1 emottot1@1 emottot2@1 emottot3@1;  
linear\_e by emottot0@0 emottot1@0.667 emottot2@1.25 emottot3@1.75;  
emottot0-emottot3 (1);  
[emottot0-emottot3@0];  
int\_e ;  
linear\_e@0;  
[int\_e];  
[linear\_e];  
int\_e with linear\_e@0;

int\_p by phytot0@1 phytot1@1 phytot2@1 phytot3@1;  
linear\_p by phytot0@0 phytot1@0.667 phytot2@1.25 phytot3@1.75;  
phytot0-phytot3;  
[phytot0-phytot3@0];  
int\_p;  
linear\_p;  
[int\_p];  
[linear\_p];  
int\_p with linear\_p;

int\_e with int\_p;  
int\_e with linear\_p@0;

linear\_e with int\_p@0;  
linear\_e with linear\_p@0;

emottot0 with phytot0;  
emottot1 with phytot1;  
emottot2 with phytot2;  
emottot3 with phytot3;

int\_e on male;  
int\_e on age45;  
int\_e on ed\_yrs7;  
int\_e on uktime1;  
linear\_e on male;  
linear\_e on age45;  
linear\_e on ed\_yrs7;  
linear\_e on uktime1;  
int\_p on male;  
int\_p on age45;  
int\_p on ed\_yrs7;  
int\_p on uktime1;  
linear\_p on male;  
linear\_p on age45;  
linear\_p on ed\_yrs7;  
linear\_p on uktime1;

Model iraqi:

emottot0-emottot3 (2);  
int\_e ;  
linear\_e@0;  
[int\_e];  
[linear\_e];  
int\_e with linear\_e@0;

phytot0-phytot3;  
int\_p;  
linear\_p;  
[int\_p];  
[linear\_p];  
int\_p with linear\_p;

int\_e with int\_p;  
int\_e with linear\_p@0;  
linear\_e with int\_p@0;  
linear\_e with linear\_p@0;

emottot0 with phytot0;

emottot1 with phytot1;  
emottot2 with phytot2;  
emottot3 with phytot3;

int\_e on male;  
int\_e on age45;  
int\_e on ed\_yrs7;  
int\_e on uktime1;  
linear\_e on male;  
linear\_e on age45;  
linear\_e on ed\_yrs7;  
linear\_e on uktime1;  
int\_p on male;  
int\_p on age45;  
int\_p on ed\_yrs7;  
int\_p on uktime1;  
linear\_p on male;  
linear\_p on age45;  
linear\_p on ed\_yrs7;  
linear\_p on uktime1;

## MULTIGROUP MULTIVARIATE CONDITIONAL B

Model:

int\_e by emottot0@1 emottot1@1 emottot2@1 emottot3@1;  
linear\_e by emottot0@0 emottot1@0.667 emottot2@1.25 emottot3@1.75;  
emottot0-emottot3 (1);  
[emottot0-emottot3@0];  
int\_e ;  
linear\_e@0;  
[int\_e];  
[linear\_e];  
int\_e with linear\_e@0;

int\_p by phytot0@1 phytot1@1 phytot2@1 phytot3@1;  
linear\_p by phytot0@0 phytot1@0.667 phytot2@1.25 phytot3@1.75;  
phytot0-phytot3;  
[phytot0-phytot3@0];  
int\_p;  
linear\_p;  
[int\_p];  
[linear\_p];  
int\_p with linear\_p;

int\_e with int\_p;  
int\_e with linear\_p@0;

linear\_e with int\_p@0;  
linear\_e with linear\_p@0;

emottot0 with phytot0;  
emottot1 with phytot1;  
emottot2 with phytot2;  
emottot3 with phytot3;

int\_e on male (81);  
int\_e on age45;  
int\_e on ed\_yrs7;  
int\_e on uktime1;  
linear\_e on male (82);  
linear\_e on age45;  
linear\_e on ed\_yrs7;  
linear\_e on uktime1;  
int\_p on male (83);  
int\_p on age45;  
int\_p on ed\_yrs7;  
int\_p on uktime1;  
linear\_p on male (84);  
linear\_p on age45;  
linear\_p on ed\_yrs7;  
linear\_p on uktime1;

Model iraqi:  
emottot0-emottot3 (2);  
int\_e ;  
linear\_e@0;  
[int\_e];  
[linear\_e];  
int\_e with linear\_e@0;

phytot0-phytot3;  
int\_p;  
linear\_p;  
[int\_p];  
[linear\_p];  
int\_p with linear\_p;

int\_e with int\_p;  
int\_e with linear\_p@0;  
linear\_e with int\_p@0;  
linear\_e with linear\_p@0;

emottot0 with phytot0;



emottot1 with phytot1;  
emottot2 with phytot2;  
emottot3 with phytot3;

int\_e on male (81);  
int\_e on age45;  
int\_e on ed\_yrs7;  
int\_e on uktime1;  
linear\_e on male (82);  
linear\_e on age45;  
linear\_e on ed\_yrs7;  
linear\_e on uktime1;  
int\_p on male (83);  
int\_p on age45;  
int\_p on ed\_yrs7;  
int\_p on uktime1;  
linear\_p on male (84);  
linear\_p on age45;  
linear\_p on ed\_yrs7;  
linear\_p on uktime1;

## MULTIGROUP MULTIVARIATE CONDITIONAL C

Model:

int\_e by emottot0@1 emottot1@1 emottot2@1 emottot3@1;  
linear\_e by emottot0@0 emottot1@0.667 emottot2@1.25 emottot3@1.75;  
emottot0-emottot3 (1);  
[emottot0-emottot3@0];  
int\_e ;  
linear\_e@0;  
[int\_e];  
[linear\_e];  
int\_e with linear\_e@0;

int\_p by phytot0@1 phytot1@1 phytot2@1 phytot3@1;  
linear\_p by phytot0@0 phytot1@0.667 phytot2@1.25 phytot3@1.75;  
phytot0-phytot3;  
[phytot0-phytot3@0];  
int\_p;  
linear\_p;  
[int\_p];  
[linear\_p];  
int\_p with linear\_p;

int\_e with int\_p;  
int\_e with linear\_p@0;

linear\_e with int\_p@0;  
linear\_e with linear\_p@0;

emottot0 with phytot0;  
emottot1 with phytot1;  
emottot2 with phytot2;  
emottot3 with phytot3;

int\_e on male (81);  
int\_e on age45 (71);  
int\_e on ed\_yrs7;  
int\_e on uktime1;  
linear\_e on male (82);  
linear\_e on age45 (72);  
linear\_e on ed\_yrs7;  
linear\_e on uktime1;  
int\_p on male (83);  
int\_p on age45 (73);  
int\_p on ed\_yrs7;  
int\_p on uktime1;  
linear\_p on male (84);  
linear\_p on age45 (74);  
linear\_p on ed\_yrs7;  
linear\_p on uktime1;

Model iraqi:

emottot0-emottot3 (2);  
int\_e ;  
linear\_e@0;  
[int\_e];  
[linear\_e];  
int\_e with linear\_e@0;

phytot0-phytot3;  
int\_p;  
linear\_p;  
[int\_p];  
[linear\_p];  
int\_p with linear\_p;

int\_e with int\_p;  
int\_e with linear\_p@0;  
linear\_e with int\_p@0;  
linear\_e with linear\_p@0;

emottot0 with phytot0;

emottot1 with phytot1;  
emottot2 with phytot2;  
emottot3 with phytot3;

int\_e on male (81);  
int\_e on age45 (71);  
int\_e on ed\_yrs7;  
int\_e on uktime1;  
linear\_e on male (82);  
linear\_e on age45 (72);  
linear\_e on ed\_yrs7;  
linear\_e on uktime1;  
int\_p on male (83);  
int\_p on age45 (73);  
int\_p on ed\_yrs7;  
int\_p on uktime1;  
linear\_p on male (84);  
linear\_p on age45 (74);  
linear\_p on ed\_yrs7;  
linear\_p on uktime1;

## MULTIGROUP MULTIVARIATE CONDITIONAL D

Model:

int\_e by emottot0@1 emottot1@1 emottot2@1 emottot3@1;  
linear\_e by emottot0@0 emottot1@0.667 emottot2@1.25 emottot3@1.75;  
emottot0-emottot3 (1);  
[emottot0-emottot3@0];  
int\_e ;  
linear\_e@0;  
[int\_e];  
[linear\_e];  
int\_e with linear\_e@0;

int\_p by phytot0@1 phytot1@1 phytot2@1 phytot3@1;  
linear\_p by phytot0@0 phytot1@0.667 phytot2@1.25 phytot3@1.75;  
phytot0-phytot3;  
[phytot0-phytot3@0];  
int\_p;  
linear\_p;  
[int\_p];  
[linear\_p];  
int\_p with linear\_p;

int\_e with int\_p;  
int\_e with linear\_p@0;

linear\_e with int\_p@0;  
linear\_e with linear\_p@0;

emottot0 with phytot0;  
emottot1 with phytot1;  
emottot2 with phytot2;  
emottot3 with phytot3;

int\_e on male (81);  
int\_e on age45 (71);  
int\_e on ed\_yrs7 (61);  
int\_e on uktime1;  
linear\_e on male (82);  
linear\_e on age45 (72);  
linear\_e on ed\_yrs7 (62);  
linear\_e on uktime1;  
int\_p on male (83);  
int\_p on age45 (73);  
int\_p on ed\_yrs7 (63);  
int\_p on uktime1;  
linear\_p on male (84);  
linear\_p on age45 (74);  
linear\_p on ed\_yrs7 (64);  
linear\_p on uktime1;

Model iraqi:

emottot0-emottot3 (2);  
int\_e ;  
linear\_e@0;  
[int\_e];  
[linear\_e];  
int\_e with linear\_e@0;

phytot0-phytot3;  
int\_p;  
linear\_p;  
[int\_p];  
[linear\_p];  
int\_p with linear\_p;

int\_e with int\_p;  
int\_e with linear\_p@0;  
linear\_e with int\_p@0;  
linear\_e with linear\_p@0;

emottot0 with phytot0;

emottot1 with phytot1;  
emottot2 with phytot2;  
emottot3 with phytot3;

int\_e on male (81);  
int\_e on age45 (71);  
int\_e on ed\_yrs7 (61);  
int\_e on uktime1;  
linear\_e on male (82);  
linear\_e on age45 (72);  
linear\_e on ed\_yrs7 (62);  
linear\_e on uktime1;  
int\_p on male (83);  
int\_p on age45 (73);  
int\_p on ed\_yrs7 (63);  
int\_p on uktime1;  
linear\_p on male (84);  
linear\_p on age45 (74);  
linear\_p on ed\_yrs7 (64);  
linear\_p on uktime1;

## MULTIGROUP MULTIVARIATE CONDITIONAL E

Model:

int\_e by emottot0@1 emottot1@1 emottot2@1 emottot3@1;  
linear\_e by emottot0@0 emottot1@0.667 emottot2@1.25 emottot3@1.75;  
emottot0-emottot3 (1);  
[emottot0-emottot3@0];  
int\_e ;  
linear\_e@0;  
[int\_e];  
[linear\_e];  
int\_e with linear\_e@0;

int\_p by phytot0@1 phytot1@1 phytot2@1 phytot3@1;  
linear\_p by phytot0@0 phytot1@0.667 phytot2@1.25 phytot3@1.75;  
phytot0-phytot3;  
[phytot0-phytot3@0];  
int\_p;  
linear\_p;  
[int\_p];  
[linear\_p];  
int\_p with linear\_p;

int\_e with int\_p;  
int\_e with linear\_p@0;

linear\_e with int\_p@0;  
linear\_e with linear\_p@0;

emottot0 with phytot0;  
emottot1 with phytot1;  
emottot2 with phytot2;  
emottot3 with phytot3;

int\_e on male (81);  
int\_e on age45 (71);  
int\_e on ed\_yrs7 (61);  
int\_e on uktime1 (51);  
linear\_e on male (82);  
linear\_e on age45 (72);  
linear\_e on ed\_yrs7 (62);  
linear\_e on uktime1 (52);  
int\_p on male (83);  
int\_p on age45 (73);  
int\_p on ed\_yrs7 (63);  
int\_p on uktime1 (53);  
linear\_p on male (84);  
linear\_p on age45 (74);  
linear\_p on ed\_yrs7 (64);  
linear\_p on uktime1 (54);

Model iraqi:

emottot0-emottot3 (2);  
int\_e ;  
linear\_e@0;  
[int\_e];  
[linear\_e];  
int\_e with linear\_e@0;

phytot0-phytot3;  
int\_p;  
linear\_p;  
[int\_p];  
[linear\_p];  
int\_p with linear\_p;

int\_e with int\_p;  
int\_e with linear\_p@0;  
linear\_e with int\_p@0;  
linear\_e with linear\_p@0;

emottot0 with phytot0;

emottot1 with phytot1;  
emottot2 with phytot2;  
emottot3 with phytot3;

int\_e on male (81);  
int\_e on age45 (71);  
int\_e on ed\_yrs7 (61);  
int\_e on uktime1 (51);  
linear\_e on male (82);  
linear\_e on age45 (72);  
linear\_e on ed\_yrs7 (62);  
linear\_e on uktime1 (52);  
int\_p on male (83);  
int\_p on age45 (73);  
int\_p on ed\_yrs7 (63);  
int\_p on uktime1 (53);  
linear\_p on male (84);  
linear\_p on age45 (74);  
linear\_p on ed\_yrs7 (64);  
linear\_p on uktime1 (54);

## MULTIGROUP MULTIVARIATE CONDITIONAL F

Model:

int\_e by emottot0@1 emottot1@1 emottot2@1 emottot3@1;  
linear\_e by emottot0@0 emottot1@0.667 emottot2@1.25 emottot3@1.75;  
emottot0-emottot3 (1);  
[emottot0-emottot3@0];  
int\_e ;  
linear\_e@0;  
[int\_e](3);  
[linear\_e](4);  
int\_e with linear\_e@0;

int\_p by phytot0@1 phytot1@1 phytot2@1 phytot3@1;  
linear\_p by phytot0@0 phytot1@0.667 phytot2@1.25 phytot3@1.75;  
phytot0-phytot3;  
[phytot0-phytot3@0];  
int\_p;  
linear\_p;  
[int\_p](5);  
[linear\_p](6);  
int\_p with linear\_p;

int\_e with int\_p;  
int\_e with linear\_p@0;

linear\_e with int\_p@0;  
linear\_e with linear\_p@0;

emottot0 with phytot0;  
emottot1 with phytot1;  
emottot2 with phytot2;  
emottot3 with phytot3;

int\_e on male (81);  
int\_e on age45 (71);  
int\_e on ed\_yrs7 (61);  
int\_e on uktime1 (51);  
linear\_e on male (82);  
linear\_e on age45 (72);  
linear\_e on ed\_yrs7 (62);  
linear\_e on uktime1 (52);  
int\_p on male (83);  
int\_p on age45 (73);  
int\_p on ed\_yrs7 (63);  
int\_p on uktime1 (53);  
linear\_p on male (84);  
linear\_p on age45 (74);  
linear\_p on ed\_yrs7 (64);  
linear\_p on uktime1 (54);

Model iraqi:

emottot0-emottot3 (2);  
int\_e ;  
linear\_e@0;  
[int\_e](3);  
[linear\_e](4);  
int\_e with linear\_e@0;

phytot0-phytot3;  
int\_p;  
linear\_p;  
[int\_p](5);  
[linear\_p](6);  
int\_p with linear\_p;

int\_e with int\_p;  
int\_e with linear\_p@0;  
linear\_e with int\_p@0;  
linear\_e with linear\_p@0;

emottot0 with phytot0;



emottot1 with phytot1;  
emottot2 with phytot2;  
emottot3 with phytot3;

int\_e on male (81);  
int\_e on age45 (71);  
int\_e on ed\_yrs7 (61);  
int\_e on uktime1 (51);  
linear\_e on male (82);  
linear\_e on age45 (72);  
linear\_e on ed\_yrs7 (62);  
linear\_e on uktime1 (52);  
int\_p on male (83);  
int\_p on age45 (73);  
int\_p on ed\_yrs7 (63);  
int\_p on uktime1 (53);  
linear\_p on male (84);  
linear\_p on age45 (74);  
linear\_p on ed\_yrs7 (64);  
linear\_p on uktime1 (54);

## MULTIGROUP MULTIVARIATE CONDITIONAL G

Model:

int\_e by emottot0@1 emottot1@1 emottot2@1 emottot3@1;  
linear\_e by emottot0@0 emottot1@0.667 emottot2@1.25 emottot3@1.75;  
emottot0-emottot3 (1);  
[emottot0-emottot3@0];  
int\_e (111);  
linear\_e@0;  
[int\_e](3);  
[linear\_e](4);  
int\_e with linear\_e@0;

int\_p by phytot0@1 phytot1@1 phytot2@1 phytot3@1;  
linear\_p by phytot0@0 phytot1@0.667 phytot2@1.25 phytot3@1.75;  
phytot0-phytot3;  
[phytot0-phytot3@0];  
int\_p (112);  
linear\_p (113);  
[int\_p](5);  
[linear\_p](6);  
int\_p with linear\_p (114);

int\_e with int\_p (115);  
int\_e with linear\_p@0;

linear\_e with int\_p@0;  
linear\_e with linear\_p@0;

emottot0 with phytot0;  
emottot1 with phytot1;  
emottot2 with phytot2;  
emottot3 with phytot3;

int\_e on male (81);  
int\_e on age45 (71);  
int\_e on ed\_yrs7 (61);  
int\_e on uktime1 (51);  
linear\_e on male (82);  
linear\_e on age45 (72);  
linear\_e on ed\_yrs7 (62);  
linear\_e on uktime1 (52);  
int\_p on male (83);  
int\_p on age45 (73);  
int\_p on ed\_yrs7 (63);  
int\_p on uktime1 (53);  
linear\_p on male (84);  
linear\_p on age45 (74);  
linear\_p on ed\_yrs7 (64);  
linear\_p on uktime1 (54);

Model iraqi:

emottot0-emottot3 (2);  
int\_e (111);  
linear\_e@0;  
[int\_e](3);  
[linear\_e](4);  
int\_e with linear\_e@0;

phytot0-phytot3;  
int\_p (112);  
linear\_p (113);  
[int\_p](5);  
[linear\_p](6);  
int\_p with linear\_p (114);

int\_e with int\_p (115);  
int\_e with linear\_p@0;  
linear\_e with int\_p@0;  
linear\_e with linear\_p@0;

emottot0 with phytot0;

emottot1 with phytot1;  
emottot2 with phytot2;  
emottot3 with phytot3;

int\_e on male (81);  
int\_e on age45 (71);  
int\_e on ed\_yrs7 (61);  
int\_e on uktime1 (51);  
linear\_e on male (82);  
linear\_e on age45 (72);  
linear\_e on ed\_yrs7 (62);  
linear\_e on uktime1 (52);  
int\_p on male (83);  
int\_p on age45 (73);  
int\_p on ed\_yrs7 (63);  
int\_p on uktime1 (53);  
linear\_p on male (84);  
linear\_p on age45 (74);  
linear\_p on ed\_yrs7 (64);  
linear\_p on uktime1 (54);

## MULTIGROUP MULTIVARIATE CONDITIONAL H

Model:

int\_e by emottot0@1 emottot1@1 emottot2@1 emottot3@1;  
linear\_e by emottot0@0 emottot1@0.667 emottot2@1.25 emottot3@1.75;  
emottot0-emottot3 (1);  
[emottot0-emottot3@0];  
int\_e (111);  
linear\_e@0;  
[int\_e](3);  
[linear\_e](4);  
int\_e with linear\_e@0;

int\_p by phytot0@1 phytot1@1 phytot2@1 phytot3@1;  
linear\_p by phytot0@0 phytot1@0.667 phytot2@1.25 phytot3@1.75;  
phytot0(121);  
phytot1(122);  
phytot2(123);  
phytot3(124);  
[phytot0-phytot3@0];  
int\_p (112);  
linear\_p (113);  
[int\_p](5);  
[linear\_p](6);  
int\_p with linear\_p (114);

int\_e with int\_p (115);  
int\_e with linear\_p@0;  
linear\_e with int\_p@0;  
linear\_e with linear\_p@0;

emottot0 with phytot0(125);  
emottot1 with phytot1(126);  
emottot2 with phytot2(127);  
emottot3 with phytot3(128);

int\_e on male (81);  
int\_e on age45 (71);  
int\_e on ed\_yrs7 (61);  
int\_e on uktime1 (51);  
linear\_e on male (82);  
linear\_e on age45 (72);  
linear\_e on ed\_yrs7 (62);  
linear\_e on uktime1 (52);  
int\_p on male (83);  
int\_p on age45 (73);  
int\_p on ed\_yrs7 (63);  
int\_p on uktime1 (53);  
linear\_p on male (84);  
linear\_p on age45 (74);  
linear\_p on ed\_yrs7 (64);  
linear\_p on uktime1 (54);

Model iraqi:

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int\_e (111);  
linear\_e@0;  
[int\_e](3);  
[linear\_e](4);  
int\_e with linear\_e@0;

phytot0 (121);  
phytot1 (122);  
phytot2 (123);  
phytot3 (124);  
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linear\_p (113);  
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[linear\_p](6);  
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linear\_e with int\_p@0;  
linear\_e with linear\_p@0;

emottot0 with phytot0(125);  
emottot1 with phytot1(126);  
emottot2 with phytot2(127);  
emottot3 with phytot3(128);

int\_e on male (81);  
int\_e on age45 (71);  
int\_e on ed\_yrs7 (61);  
int\_e on uktime1 (51);  
linear\_e on male (82);  
linear\_e on age45 (72);  
linear\_e on ed\_yrs7 (62);  
linear\_e on uktime1 (52);  
int\_p on male (83);  
int\_p on age45 (73);  
int\_p on ed\_yrs7 (63);  
int\_p on uktime1 (53);  
linear\_p on male (84);  
linear\_p on age45 (74);  
linear\_p on ed\_yrs7 (64);  
linear\_p on uktime1 (54);

Appendix B

**Nashville Refugee Health Questionnaire**

This is a survey about your experiences and needs that relate to health. We will use this information to design better services and to understand health of refugees living in Nashville.

Thank you so much for your help!

1. Are you male or female (*please choose one*)?

- Male
- Female

2. Are you a refugee (*please choose one*)?

- Yes
- No

3. What is your race/ethnicity?(*please write in the blank*) \_\_\_\_\_

4. How often do you turn to religion or spiritual beliefs to help you deal with your daily problems (for example, praying, going to the imam, considering your beliefs when making decisions, etc.)? (*please choose one*)

- Never
- Rarely
- Sometimes
- Often
- Always

5. How well do you do the following: (*please choose one response for every line / row*)?

	Very Well	Well	Not Well	Not at All
a. Speak English	_____	_____	_____	_____
b. Read English	_____	_____	_____	_____

6. What is your current relationship status (*please choose one*)?

- Never married
- Married and living with my spouse
- Married, but my spouse lives somewhere else
- Separated or divorced
- Widowed

7. How old are you? \_\_\_\_\_ Years old

8. What year were you displaced from your home for the first time? \_\_\_\_\_ Year
9. Between leaving home and coming to the U.S., how many countries did you live in? \_\_\_\_\_ Countries
10. How much time (in total) did you spend in refugee camps? \_\_\_\_\_ Years
11. When did you arrive to live in the United States? \_\_\_\_\_ Year
12. How many adult refugees from Somalia do you know in Nashville? \_\_\_\_\_ Refugees
13. Do you or your family own the home you live in? \_\_\_\_\_ Yes \_\_\_\_\_ No
14. How many of your neighbors are from Somalia? \_\_\_\_\_ Most \_\_\_\_\_ Some \_\_\_\_\_ None
15. What is your home's address? (We will NOT share it with people beyond the research team).  
\_\_\_\_\_
- 
16. Do you have a car or other vehicle? \_\_\_\_\_ Yes \_\_\_\_\_ No
17. What is the highest level of education that you have completed? (*please choose one*)
- \_\_\_\_\_ No formal schooling
  - \_\_\_\_\_ Have had some schooling, but have not finished high school
  - \_\_\_\_\_ Have completed high school or a GED
  - \_\_\_\_\_ Have completed an Associate's Degree or Certificate
  - \_\_\_\_\_ Have completed a Bachelor's Degree or Post-graduate Degree (Master's Degree, Doctorate, etc.)
18. Are you currently employed (*please choose one*)?
- \_\_\_\_\_ Not currently earning money
  - \_\_\_\_\_ Self-employed (own your own company or organization)
  - \_\_\_\_\_ Employed **part-time** by company or organization
  - \_\_\_\_\_ Employed **full-time** by company or organization
19. If you are not currently employed, what is the main reason for this (*please choose one*)?
- \_\_\_\_\_ Caring for family
  - \_\_\_\_\_ Studies / training
  - \_\_\_\_\_ Retired
  - \_\_\_\_\_ Looking for a job OR looked and couldn't find one
  - \_\_\_\_\_ Ill health
  - \_\_\_\_\_ Not authorized to work
20. During the past 12 months, what has been your main job or work? \_\_\_\_\_
21. Do you send money to friends or family in other countries? \_\_\_\_\_ No  
 \_\_\_\_\_ Yes, less than half of the money I earn  
 \_\_\_\_\_ Yes, more than half of the money I earn

Now we will ask you questions about your health.

22. In general, would you say your health is (*please choose one*):

Excellent  
 Very Good  
 Good  
 Fair  
 Poor

23. Does your **health** prevent you from the following?

	Very difficult	Somewhat difficult	Not difficult
a. <b>Vigorous activities</b> (running, lifting heavy objects, participating in strenuous sports)	_____	_____	_____
b. <b>Moderate activities</b> (moving a table, pushing a vacuum)	_____	_____	_____
c. Climbing <b>several</b> staircases at one time	_____	_____	_____
d. Walking <b>several blocks</b>	_____	_____	_____

24. During the past four weeks:

	Not at all	Some	A Lot
a. How much have you been <b>bothered by emotional problems?</b> (such as feeling worried, depressed or stressed)	_____	_____	_____
b. How much did <b>emotional problems limit</b> what you would usually do each day (e.g. working, seeing friends)?	_____	_____	_____
c. How much did <b>physical health problems limit</b> what you would usually do each day (e.g. working, seeing friends)?	_____	_____	_____

25. In the past week, have these things happened to you?

	Not at all	A little	Quite a bit	Extremely
a. Suddenly scared for no reason.	_____	_____	_____	_____
b. Feeling fearful.	_____	_____	_____	_____
c. Faintness, dizziness, or weakness.	_____	_____	_____	_____
d. Heart pounding or racing.	_____	_____	_____	_____
e. Trembling.	_____	_____	_____	_____
f. Feeling tense or keyed up.	_____	_____	_____	_____
g. Headaches.	_____	_____	_____	_____
h. Feeling restless, can't sit still.	_____	_____	_____	_____
i. Feeling low in energy, slowed down.	_____	_____	_____	_____
j. Blaming yourself for things.	_____	_____	_____	_____
k. Crying easily.	_____	_____	_____	_____



	Not at all	A little	Quite a bit	Extremely
l. Loss of sexual interest or pleasure.	_____	_____	_____	_____
m. Poor appetite.	_____	_____	_____	_____
n. Difficulty falling asleep and sleeping.	_____	_____	_____	_____
o. Feeling hopeless about the future.	_____	_____	_____	_____
p. Feeling sad.	_____	_____	_____	_____
q. Feeling lonely.	_____	_____	_____	_____
r. Feeling of being trapped or caught.	_____	_____	_____	_____
s. Worrying too much about things.	_____	_____	_____	_____
t. Feeling no interest in things.	_____	_____	_____	_____
u. Feeling everything is an effort.	_____	_____	_____	_____
v. Feelings of worthlessness.	_____	_____	_____	_____

The following questions are about yourself and your relationships.

26. Do you agree?

	Agree	Neither	Disagree
a. You have many good qualities.	_____	_____	_____
b. You are able to do things as well as most other people.	_____	_____	_____
c. In general, you are satisfied with yourself.	_____	_____	_____
d. In general, you feel that you are a failure.	_____	_____	_____
e. You have little control over the things that happen to you.	_____	_____	_____
f. There is no way you can solve some of your problems.	_____	_____	_____
g. You can do just about anything you really set your mind to.	_____	_____	_____
h. You do not have close personal relationships with others.	_____	_____	_____
i. There are people who depend on you for help.	_____	_____	_____
j. If something went wrong, no one would help you.	_____	_____	_____
k. You are part of a group of people who share your attitudes and beliefs.	_____	_____	_____
l. Other people do not respect your skills and abilities.	_____	_____	_____
m. There is someone you could talk to about important decisions in your life.	_____	_____	_____
n. You are always courteous even to people who are disagreeable.	_____	_____	_____
o. There have been occasions when you took advantage of someone.	_____	_____	_____
p. You sometimes try to get even rather than forgive and forget.	_____	_____	_____
q. You sometimes feel resentful when you don't get your way.	_____	_____	_____
r. No matter who you are talking to, you are always a good listener.	_____	_____	_____

27. How important is each of the following communities to you?

	Very Important	Somewhat Important	Not Important
a. Religious community (your church, mosque, etc.)	_____	_____	_____
b. Ethnic community (other Iraqis, Somalis, etc.)	_____	_____	_____
c. Neighborhood (the area around where you live)	_____	_____	_____
d. Your school (the other people who go to school with you)	_____	_____	_____
e. Workplace (the people who work at the same place that you do)	_____	_____	_____
f. Family and relatives	_____	_____	_____
g. Other (specify) _____	_____	_____	_____

28. Do you agree?

	Agree	Not Sure	Disagree
a. I have a strong sense of belonging to my ethnic group.	_____	_____	_____
b. I feel comfortable around people of my ethnic group.	_____	_____	_____
c. My closest friends are members of my ethnic group.	_____	_____	_____
d. I have a strong sense of belonging as an American.	_____	_____	_____
e. I feel comfortable around people who were born in America.	_____	_____	_____
f. My closest friends were born in America.	_____	_____	_____

Now we ask about experiences that might be stressful.

29. In your day-to-day life, how often have these things happened to you?

	Never	Some	Often
a. People treated you with less respect than other people?	_____	_____	_____
b. People treated you unfairly at restaurants or stores?	_____	_____	_____
c. People criticized your accent or the way you speak?	_____	_____	_____
d. People acted as if they think you are not smart?	_____	_____	_____
e. People acted as if they are afraid of you?	_____	_____	_____
f. People acted as if they think you are dishonest?	_____	_____	_____
g. People acted as if they're better than you are?	_____	_____	_____
h. People threatened or harassed you?	_____	_____	_____
i. Why do these things happen to you ( <i>choose all that apply</i> )?			

\_\_\_ Gender

\_\_\_ Ethnicity / Race / Skin Color

\_\_\_ Religion

\_\_\_ Social Class

\_\_\_ Accent / English Skills

\_\_\_ Sexual Orientation

\_\_\_ Age

\_\_\_ Other

30. Do you agree?

	Not True	Somewhat True	Very True
a. There is always too much to do.	_____	_____	_____
b. Other people expect too much from you.	_____	_____	_____
c. You or your family struggle to meet financial obligations and/or pay for monthly expenses.	_____	_____	_____
d. You are unhappy with your work/job/school (or don't have one).	_____	_____	_____
e. You have conflict with someone you see often or someone who is important to you (family member, friend, co-worker, etc.).	_____	_____	_____
f. You are unfulfilled by your relationship (or want to be in one, but are not).	_____	_____	_____
g. You are very unhappy.	_____	_____	_____
h. Someone you care about is very unhappy.	_____	_____	_____
i. You feel lonely or isolated.	_____	_____	_____
j. Your daily freedom is restricted by someone (a family member, a partner) or by something (transportation, immigration status).	_____	_____	_____
k. You are in poor health.	_____	_____	_____
l. Someone you care about is in poor health.	_____	_____	_____
m. You are unhappy with the place that you live (noise, pollution, safety, etc.)	_____	_____	_____
n. Your religious or spiritual needs are unfulfilled.	_____	_____	_____
o. You miss your family, friends, or country back home.	_____	_____	_____
p. You have been separated from a key family member (e.g., your spouse or child lives in another country).	_____	_____	_____
q. Your immigration status or the status of someone important to you (child, family member, etc.) is unsettled or troubling.	_____	_____	_____
r. You have trouble communicating with people because of language or cultural barriers.	_____	_____	_____
s. You worry about you or your family losing your ethnic identity.	_____	_____	_____

31. Please put an X on the line if this happened to you while you were living in each country (*mark all that apply*).

	Somalia	U.S.	Neither
a. Relative to other people, you were well-respected.	_____	_____	_____
b. You felt very stressed.	_____	_____	_____
c. You had a strong sense of community.	_____	_____	_____
d. You experienced discrimination because of your race or ethnicity.	_____	_____	_____
e. You experienced discrimination because of your tribal or family affiliation.	_____	_____	_____

32. Have these ever happened to you or someone you know? You can mark more than one per question.

	Happened to You	Saw it Happen to Someone Else	None
a. Natural or other disaster (flood, hurricane, earthquake, fire, explosion)	_____	_____	_____
b. Serious accident (car, plane, work, home, recreational activity)	_____	_____	_____
c. Exposure to toxic substance (chemicals, radiation)	_____	_____	_____
d. Assault (being attacked, hit, kicked, beaten up, shot, stabbed)	_____	_____	_____
e. Sexual assault (rape, attempted rape) or any unwanted sexual experience	_____	_____	_____
f. Combat or exposure to a war-zone (military or as a civilian)	_____	_____	_____
g. Captivity (kidnapped, held hostage, prisoner of war)	_____	_____	_____
h. Life-threatening illness or injury	_____	_____	_____
i. Severe human suffering	_____	_____	_____
j. Sudden death (homicide, suicide, accident)	_____	_____	_____

Now we will ask you about health care services and things that you do that might affect your health.

33. When you need to go to the doctor for a physical or emotional health problem, how do you pay for services?

- I have private health insurance.
- I have public government assistance through Medicaid (TennCare) or Medicare.
- I do not have insurance; I pay for all medical care with my own money.

34. Do you have one person you think of as your personal doctor or health care provider?

Yes  No, or I'm not sure

35. Was there a time in the past year when you needed to see a doctor but did not? (*mark all that apply*)

- Yes; Please tell us the reason \_\_\_\_\_ (e.g. too expensive)
- No, I have always been able to see a doctor if I needed to

36. If you needed to learn about a health problem, would you know where to go or who to talk to for information?

Yes  No

37. Please think of the last time that you visited a professional for a health-related issue (visit a doctor, nurse, clinic, hospital, or other health service).

- a. Which doctor, clinic, or hospital did you use? \_\_\_\_\_
- b. Were you satisfied with the services you received? (*please choose one*)

Very satisfied     Somewhat satisfied     Dissatisfied     Very dissatisfied

38. When you go to the doctor, can you communicate with him or her?

- This is not a problem because I am fluent in English
- This is not a problem because there is always an interpreter available
- This is a problem 1 – 25% of the time
- This is a problem more than 25% of the time

39. Do you currently smoke any tobacco product such as cigarettes, cigars, or pipes?

- Yes, everyday
- Yes, but not everyday
- No, not at all
- No, but I used to smoke

40. Some people eat fruits and vegetables a lot. If you don't eat them a lot, what is the reason?

- Me or a family member doesn't like the taste
- They are too expensive
- I don't know how to buy / cook / prepare them
- There is nowhere near me to buy them
- I don't have time to buy / cook / prepare them
- Other \_\_\_\_\_

41. Some people exercise a lot. If you don't exercise a lot, what is the reason?

- I don't have time / I am too busy
- I don't want to exercise
- I cannot exercise because of a health issue
- I don't know how to exercise
- There is nowhere convenient for me to exercise
- Other \_\_\_\_\_

42. Do you have any other comments that you would like to provide to the creators of this survey?

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Thank you so much for your time!

## Appendix C

### Focus Group Discussion Guide

<<not all questions will be asked since there won't be enough time to cover all topics; instead the facilitator will attempt to cover what is possible in the given timeframe and will pursue topics that seem to be of primary importance or interest to the participants>>

#### I. General Health

- a. What does it mean to be healthy? How do you think about health? What do you think other Somalis think about health?
- b. When you are asked on the survey to “please rate your health on a scale from poor to excellent” then what do you think of? How do you go about answering that question? What types of health or illness would you consider? Does that include emotional health issues or just physical ones? Is there any reluctance to admit to having health problems? If those problems are emotional in nature, then is there more reluctance to admit to them? What about other Somalis?
- c. The majority of Somalis surveyed said that they have very good or excellent health. Is this realistic? Why or why not? If not, why would they say this?
- d. What can one do to stay healthy?
- e. Consider the health measures from the survey – please tell us your reaction to the item. Would you or other Somalis be reluctant to admit to these symptoms? [e.g., crying easily, feeling worthless]
- f. Many people said that they did not have any of these symptoms. Do you think that is realistic? Do you think that there are reasons that people did not say they have these symptoms?
- g. There were a series of questions about other things – please tell us your reaction to the item. [e.g., you feel that you are a failure, you have little control over the things that happen to you]

#### II. Stressors

- a. What are the most stressful things in your life? Are there differences between the stress you feel in America and the stress that you felt in Somalia (or in transition)?
- b. What are some other differences between your life in America and your life before coming here?
- c. Somalis have also reported very low rates of traumatic experiences (like being in an accident, being beaten or assaulted, being in combat, being captured, etc.). Do you think this is realistic? Why or why not? Why would they answer this way?

III. Acculturation: These questions are about what happens to people as they are in America longer – there are some obvious changes, like people might learn more English, people might learn more about American ways of doing things, etc. But there also might be changes in the way that they think, the way that they act, the values that they have, and what is important to them.

- a. Do you think that there are “Somali” cultural characteristics? What are they? Are there “American cultural characteristics? What are they?
- b. How do values change over time living in America?
- c. How does identity change over time living in America?
- d. How do behaviors change over time living in America?
- e. Do you think that any of this relates to health – either emotional or physical?
- f. What about your neighborhood? How does living in a neighborhood with other Somalis affect your transition to life in America?

IV. Expectations

- a. Before you were resettled to the US, what were your expectations about life here?
- b. Have those expectations been met? What was unexpected? Are these differences good or bad?

V. Solutions & Interventions

- a. What solutions are there to health problems among Somali refugees? Preventive? Health literacy? Health care?
- b. What kinds of services and programs that CRIT (or similar orgs) could provide would be useful?

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