

Hard-to-Survey Populations and Respondent-Driven Sampling: Expanding the Political Science Toolbox

Rana B. Khoury

Survey research can generate knowledge that is central to the study of collective action, public opinion, and political participation. Unfortunately, many populations—from undocumented migrants to right-wing activists and oligarchs—are hidden, lack sampling frames, or are otherwise hard to survey. An approach to hard-to-survey populations commonly taken by researchers in other disciplines is largely missing from the toolbox of political science methods: respondent-driven sampling (RDS). By leveraging relations of trust, RDS accesses hard-to-survey populations; it also promotes representativeness, systematizes data collection, and, notably, supports population inference. In approximating probability sampling, RDS makes strong assumptions. Yet if strengthened by an integrative multimethod research design, it can shed light on otherwise concealed—and critical—political preferences and behaviors among many populations of interest. Through describing one of the first applications of RDS in political science, this article provides empirically grounded guidance via a study of activist refugees from Syria. Refugees are prototypical hard-to-survey populations, and mobilized ones are even more so; yet the study demonstrates that RDS can provide a systematic and representative account of a vulnerable population engaged in major political phenomena.

What forms does political participation take among disparate classes of society? Why do individuals overcome collective action problems? How do people's identities, engagements, and affiliations affect their preferences? The modern develop-

ment of academic survey research has enabled empirical assessments of these and other questions about political behavior that are central to the study of politics (Heath, Fisher, and Smith 2005). To gauge preferences, traits, or behaviors, survey researchers define a target population and then obtain a sampling frame—a list that is, ideally, accessible and comprehensive so as to represent the population. Randomly selecting elements from this frame means that each individual has a known, nonzero, and equal probability of inclusion in the sample. In turn, sound inferences can be made about the population with estimates of uncertainty; statistical theory allows us to confidently say something intelligible about a population without surveying every one of its members.

Yet political scientists are often interested in people who are not easily subjected to survey sampling. Violent extremists, first movers of protests, and undocumented migrants, for instance, are populations unlikely to be found on lists. Like right- and left-wing activists, members of nonstate armed groups, the super-rich, and refugees fleeing conflict, they are “hard to survey”: they are difficult to sample, identify, reach, persuade, or interview (Tourangeau 2014). Probabilistic approaches to sampling such populations are sometimes possible, but can often be infeasible, unethical, or unrepresentative. Nonprobabilistic surveys are used as well, but they present bias and limit generalizability.

I posit another approach, one that is designed for difficult populations *and* that approximates probability sampling—but that has been almost entirely absent from

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the toolbox of political research methods. Respondent-driven sampling (RDS) is primarily used in epidemiological studies of populations at high risk for HIV. Yet it can be deployed among any number of networked populations and is particularly well suited to hard-to-survey ones. RDS leverages relations of trust that are critical among hidden populations, increases representativeness, systematizes the sampling process, and supports external validity.

RDS procedures resemble or use tools that are common to political science, such as snowball sampling and statistical weights. For sampling, an RDS survey begins with a handful of nonrandomly selected participants from a population, or seeds. Seeds recruit a set number of peers, and the process repeats in waves, creating chains of participants linked to their recruiter and recruits by non-identifying IDs. The use of RDS extends to analysis: over the course of the survey, RDS collects information from respondents about the size of their personal networks, which is used as a weight to balance elements with unequal inclusion probabilities. This enables RDS to achieve its primary advantage: population inferences with estimates of uncertainty.

In the sections that follow, I consider the challenges posed by the study of hard-to-survey populations and the common probabilistic and nonprobabilistic approaches that political scientists take to resolve them. I review non-HIV-related applications of RDS and find that RDS is largely unknown or misused despite the range of populations on which it could shed light. I contend that the method is worthy of inclusion in the toolbox of political scientists and introduce its benefits, sampling and analysis procedures, and trade-offs. Given RDS's strong assumptions and our own disciplinary standards, I suggest that it is best used within an integrative multimethod design that can bolster RDS with conceptualization, network mapping, navigating sensitivity, understanding respondent behavior, and inference. I illustrate its use through my study of activist refugees from Syria, one of the first properly administered political science applications of RDS. A brief presentation of my findings demonstrates that RDS can provide a systematic and representative account of a vulnerable population acting to effect change in the course of a brutal conflict.

Approaches to Sampling Hard-to-Survey Populations

Some of the primary questions that political scientists ask are related to political ideas or behavior. Often, however, they ask such questions of populations that challenge standard techniques for sampling and therefore surveying. Tourangeau classifies hard-to-survey populations as being one or more of the following: “hard to sample” if they cannot be found on a population list that can serve as a sampling frame or if they are rare in the general population, “hard to identify” or “hidden” if their behavior is risky or sensitive, “hard to reach” if they are mobile and

difficult to contact, “hard to persuade” because they are unwilling to engage, or “hard to interview” because they lack the ability to participate (Tourangeau 2014). Some populations, like undocumented migrants, present multiple such challenges. They may be hard to sample because they are not documented on population lists that could constitute sampling frames; hard to identify because the visibility of their status could pose risks to their well-being; and hard to reach because, as a mobile population, they lack permanent or formal contact information. In conflict-afflicted settings, entire populations may be hard to survey because of generalized challenges of access and vulnerability (Cohen and Arieli 2011; Firchow and Mac Ginty 2017).

Some social scientists have suggested that quantitative research in difficult settings is unreliable or even impossible because of poor data quality, political sensitivity in authoritarian or conflict-afflicted areas, and the imperative of building trust among hard-to-reach populations (Bayard de Volo and Schatz 2004; Morgenbesser and Weiss 2018; Romano 2006). When research does not rely on generalizability—as may be the case with process tracing and discourse analysis—qualitative methods are indeed preferable (cf. Tansey 2007). But if we seek to make claims about a population or analyze individual-level data, can we forgo surveys on such pressing issues as migration, conflict, and contention?

Those who wish to make generalizing claims can potentially manage these challenges using probability-based strategies that, because of the properties of random sampling, allow for population estimates. Doing so requires a sampling frame from which to randomly select potential respondents. If a single representative list is unavailable, it may be feasible to supplement it with one or more incomplete lists. If no list is available, researchers might create an original frame, perhaps using societal informants to do so. Finally, researchers can intercept the target population at a place or event (a sort of embodied list), randomly selecting respondents from among the attendees. The application of these probabilistic approaches depends on the circumstances and nature of the target population, and each, if it can be implemented, has its advantages such as coverage and efficiency, as demonstrated in table 1. Yet they can fall short when it comes to many hard-to-survey populations, for whom incomplete lists may not exist, whose exposure through the creation of lists may pose risks, and whose participation in highly visible forms is unlikely.

Others rely on nonprobabilistic approaches that create study samples by means other than randomization. Analysts cannot statistically estimate the uncertainty of such data; instead, they subjectively evaluate statements about the population (Kalton 1983). Researchers nevertheless frequently deploy nonprobabilistic methods to reach both common and hard-to-survey populations. Convenience, purposive, quota, and institutional sampling are all nonprobabilistic sampling strategies, each of which

Table 1
Probabilistic and Nonprobabilistic Approaches to Sampling Hard-to-Survey (H2S) Populations

| | Used for | Advantages | Drawbacks | Example |
|--|---|--|---|--|
| Probabilistic approaches | | | | |
| Supplement frames | Unavailability of a single list | Improves coverage Supports statistical inference | Unavailability of lists for most H2S populations Costly | Wealthy elites in Chicagoland (Page, Bartels, and Seawright 2013) |
| Create original frame | Unavailability of any list(s) | Makes coverage possible Supports statistical inference | Ethics of identifying a hidden population Costly | Former rebels in Sierra Leone (Humphreys and Weinstein 2006) |
| Intercept sampling | Target population at places or events for random sampling | Efficient access in absence of a list Supports statistical inference | Coverage errors and bias Limited to highly visible forms of mobilization | Protesters and demonstrators (Norris, Walgrave, and Val Aelst 2005) |
| Nonprobabilistic approaches¹ | | | | |
| Convenience sampling | Readily available or accessible population | Good for pilot surveys Low cost | Not typically useful for hard-to-survey populations Selection bias Does not support statistical inference | Undergraduates and MTurk workers (Rothschild et al. 2019) |
| Purposive sampling | Based on expert judgment | Selection based on researcher's aims Low cost | Subject to limitations of expert's prior knowledge Does not support statistical inference | "Red shirt" and "yellow shirt" activists in Thailand (Bjarnegård, Brounéus, and Melander 2017) |
| Quota sampling | Representation of relevant characteristics | Selection based on researcher's aims Low cost | Representation of characteristics at population level may be unknown Does not support statistical inference | French and US adults based on employment status (Lü and Scheve 2016) |
| Institutional sampling | Members of a body or organization that represents target population | Institutional vehicle provides access Low cost | Selection bias Does not support statistical inference beyond the organization's membership | Tea Partiers belonging to Massachusetts Tea Party list (Skocpol and Williamson 2014) |
| Snowball sampling | Researcher access to initial participants who can recruit others | Efficient because of knowledge, access, and trust between subjects Low cost | Selection bias and representativeness Does not support statistical inference | First movers in Moroccan protests (Lawrence 2017) |

¹Nonprobability examples are of quantitative survey research only. Qualitative uses of these tools should be judged separately, because methods such as process tracing may be characterized by a distinct logic of inference.

has advantages (e.g., relatively low monetary costs), but also limitations, primarily selection bias, as seen in table 1.

A ubiquitous nonprobability sampling method is snowball sampling, wherein a researcher identifies one or more members of the population and then relies on

Table 2
Respondent-Driven Sampling for Hard-to-Survey (H2S) Populations

| | Used for | Advantages | Drawbacks | Example |
|--|--|--|---|--|
| Approximating probability Respondent-driven sampling | Researcher access to initial participants who can recruit others in a networked H2S population | Efficiency and reliability of snowball sampling because of knowledge, access, and trust between subjects | Assumptions related to sampling processes and network structure | Injection drug users in Russia (Platt et al. 2006) |
| | | Explicit mechanisms for recruitment conducive to data and research transparency | Variance estimation a matter of dispute | Men who have sex with men in Fortelesa, Brazil (Kendall et al. 2008) |
| | | Approximates a probability sample and supports statistical inference | | Female sex workers in Khartoum, Sudan (Abdelrahim 2010) |

them to identify others in the population to participate, proceeding through chains of participant referrals.¹ Snowball sampling is primarily deployed in interview and field research, in which access to a network on the basis of trustful relations is often a must. Snowball sampling is sometimes used for quantitative survey research as well. The method has distinct advantages for the study of hard-to-survey populations. Snowballing leverages relations of trust between subjects who have greater knowledge about, access to, and influence over their own community (Atkinson and Flint 2001; Cohen and Arieli 2011). These advantages can efficiently lead an outside researcher to a large pool of otherwise guarded subjects. For example, in a survey that intended to deploy probability sampling to reach foreign nationals in South Africa, potential respondents feared identifying themselves to the study team’s formal organizational partner; the team ultimately relied on the foreign nationals themselves to snowball them to their desired sample size (Misago and Landau 2013).

Researchers using snowball sampling make important contributions to the study of elusive populations. However, in addition to the fact that statistical inferences cannot be made to the population, the method tends to favor individuals with large networks, resulting in selection bias and a lack of representativeness that can extend through multiple waves of one prosocial individual’s acquaintances (Griffiths et al. 1993; Kaplan, Korf, and Sterk 1987; van Meter 1990). Yet snowballing’s advantages to political scientists studying difficult populations in challenging contexts are so significant that its use “may make the difference between research conducted under constrained circumstances and research not conducted at all” (Cohen and Arieli 2011, 433).

Respondent-Driven Sampling in the Social Sciences

I contend that there is another sampling option. RDS shares the chain-referral qualities of snowball sampling that are ideal for the study of hidden and hard-to-survey populations. Unlike snowball and other nonprobabilistic sampling strategies, however, RDS approximates a probability sample to generate population estimates. The driving force of RDS has been the epidemiological study of populations at high risk for HIV infection: men who have sex with men, female sex workers, and injection drug users. Developed by Douglas Heckathorn (1997), RDS has been used in hundreds of surveys on HIV-risk populations conducted with the support of numerous intergovernmental and national health agencies (see table 2).²

To explore the potential for RDS in political science, I began by asking if and how it has been used outside of HIV research. I conducted a systematic review of non-HIV-risk peer-reviewed social science publications that reported using RDS.³ Twenty-seven studies qualified for inclusion in the review.⁴

My impressions before conducting the review prompted me to explore whether scholars were actually deploying RDS when they said they were. Although all of them described RDS as their method, it emerged that only 10 of the 27 studies actually implemented RDS sampling (nonrandom seeds, participant recruitment, and participant linkage through IDs) and analysis (degree-based weights, population estimates) procedures. Among the majority that did not fully implement RDS were some that did not follow its protocols at all, and others used some or all of the sampling techniques but none for analysis. I suspect the method is used piecemeal because of the appeal of its systematic sampling procedures. But when methods are inappropriately

Table 3
Non-HIV-Risk RDS in the Social Sciences

| | Finding | Frequency |
|--|---|-----------|
| Disciplines | Sociology | 10 |
| | Political science | 6 |
| | Criminology | 3 |
| | Psychology | 3 |
| | Public health | 3 |
| | Other | 2 |
| Nature of hard-to-survey population¹ | Migrants or refugees | 11 |
| | Minorities or underrepresented | 6 |
| | Political dissidents/ combatants | 6 |
| | Illegal/informal/ unauthorized behavior | 5 |
| | Youth/children/elderly | 5 |
| | Victims/survivors | 4 |
| | Sexual | 3 |
| | Rural | 3 |
| | Labor-based | 3 |

¹Each study included one population, but several are classifiable across categories

labeled, the benefit of RDS's sampling transparency is overshadowed by confusion.

RDS's under- and misuse in the social sciences aside, the studies serve to illustrate the types of populations that RDS can capture, as shown in table 3. Some are explicitly defined by political behavior, including returned French colonial settlers, ex-combatants in Liberia, protesters in China, and Vietnam War resisters in Canada. Almost all of them, including migrants and refugees, would be of relevance to the study of politics. RDS, it seems, is an untapped resource for empirical political scientists.

RDS can help researchers reach a large and representative group of hard-to-survey people confidentially. Like snowball sampling, RDS reaches people who are hard for an outsider to reach or persuade, via the delegation of recruitment to members of the target population who may be encouraged to participate when referred by a trusted member of their network. This trust can be maintained, because participation remains anonymous or confidential depending on the survey protocol (although a participant's recruits can assume her participation). Further, this process can introduce a diverse set of respondents and, when balanced with statistical weights, maintain representation for those who are relatively less networked.

Additionally, RDS meets standards for data and research transparency that are increasingly emphasized in the discipline (cf. Organized Section in Comparative Politics 2016). RDS systematizes sampling designs because recruitment of survey participants proceeds through explicit mechanisms. Researchers regulate the number of

recruits, systematize modes and instructions for recruitment, and link participants with sequential or random numbers that do not compromise anonymity. RDS has become standardized as it has gained the support of major institutions including the World Health Organization and the US Centers for Disease Control and Prevention. Therefore, RDS studies can achieve production transparency, "a full account of the procedures used to collect and generate data" (APSA Committee on Professional Ethics, Rights, and Freedoms 2012, 10).

Finally, and critically, the systematic collection of data about respondents' networks allows inferences to be made about the population with estimates of uncertainty. This key quality of RDS endows a study with a reasonable degree of generalizability.

Mechanics and Trade-Offs of Respondent-Driven Sampling

Sampling and Analysis Similar to snowball sampling, RDS is a chain-referral sampling method that moves through networks of individuals defined by relevant characteristics and eligibility criteria of the target population. Sampling begins with the selection of seeds, members of the target population whom the researcher nonrandomly selects to be the initial survey participants. Seeds then recruit a set number of their peers, usually up to three, to participate. The number is limited so as not to overrepresent individuals with large personal networks. Seeds recruit by passing information about the survey and participation, along with a unique identification number that links recruiter to recruits, creating recruitment chains. This process repeats in waves within each recruitment chain, ideally until the desired sample size is reached.

As sampling proceeds, the survey collects information from participants about the number of their own connections within the larger target population, known as their degree.⁵ Eliciting accurate degree reports demands attention to three points. First, network contacts are defined by the characteristics of the target population and should meet eligibility criteria for survey participation. Second, relationships between recruits should be reciprocal: the degree reflects how many people in the target population the respondent knows, who know the respondent in turn. Third, a temporal frame for personal contact is included in the degree question(s) to further home in on an accurate degree size and ensure reciprocity of relations (Wejnert 2009). Thus, a degree question generally asks (1) how many people in the target population (e.g., people characterized by *a* living in area *b*), (2) do you know (e.g., you know their name and they know yours), (3) whom you have been in contact with in the last *c* period of time?⁶ Successive questions and probing are used to elicit accurate responses.⁷

In the analysis, the degree is used to create a weight for each element as an estimate of its inverse inclusion

probability. The logic of the degree-based inverse inclusion probability is that someone with a relatively large personal network has a high probability of coming into the sample, so is assigned a lower weight in the final analysis; conversely, someone with a relatively small degree is less likely to have been recruited and so is assigned more weight. In this way, the biases of snowball sampling are corrected, and population proportions can be estimated with uncertainty.

Performance and Assumptions RDS is considered to perform well in accessing hidden populations and creating diverse and representative samples (Abdul-Quader et al. 2006; Kendall et al. 2008; Salganik and Heckathorn 2004; Wejnert and Heckathorn 2008),⁸ especially in comparison with nonprobabilistic methods. Estimates produced by RDS have been found to be unbiased (Barash et al. 2016; Salganik and Heckathorn 2004). But its reliability in variance estimation remains an “open question” (Heckathorn and Cameron 2017); likely, confidence intervals are too narrow (Baraff, McCormick, and Raftery 2016; Goel and Salganik 2010). An additional challenge presented by the method is the absence of data on hidden populations against which estimates might be evaluated; evaluations are often based on simulated data or on data from non-hidden populations.

Unlike simple random sampling, RDS makes a number of assumptions related to sampling processes and network structure (Wejnert 2009):

1. Ties between respondents are reciprocated; that is, individuals know their recruits, who know them in turn.
2. The overall network is a single component, and each respondent can be reached by any other through a series of network ties.
3. Sampling is with replacement.
4. Respondents can accurately report their personal network size, or degree.
5. Peer referral is random from among the recruiter’s peers.

All of these assumptions can be difficult to meet. For example, with regard to assumption 5, it is reasonable to think that respondents are more likely to recruit those peers to whom they are close, with whom they have most recently been in contact, or who they think are most likely to participate, rather than stochastically. Methodologists take three approaches to RDS assumptions. First, they promote preemptive study protocols; for instance, encouraging questionnaires that use language more likely to ensure reciprocity of ties and accurate degree reports (Gile, Johnston, and Salganik 2015; WHO 2013).⁹ Second, they develop and hone both model- and design-based estimators that account

for, or in some cases, eliminate assumptions (Gile 2011; Shi, Cameron, and Heckathorn 2016; Volz and Heckathorn 2008). Third, they address the consequences of assumptions *not* being met, often finding that moderate violation of assumptions does not bias estimates (Aronow and Crawford 2015; Barash et al. 2016), but also determining that some violations can indeed undermine the method (Gile and Handcock 2010; Shi, Cameron, and Heckathorn 2016). Next I demonstrate how qualitative tools can also be used to address assumptions.

A Multimethod Approach to RDS

RDS holds promise for political scientists, but its shortcomings demand a cautious approach for a discipline that challenges its practitioners to demonstrate descriptive and causal inference. I propose that using RDS as part of a multimethod research design can mitigate its limitations and accommodate it to political studies.

Integrative multimethod research designs, according to Seawright (2016), support a single inference by using distinct methods in the service of designing, testing, refining, or bolstering each other. Following this multimethod logic, I propose that qualitative methods can be used to support an RDS survey through concept formation, network mapping, navigating sensitivity, understanding respondent behavior, and evaluating causality. In turn, an RDS survey can support a larger research design by furnishing descriptive evidence that is otherwise elusive.

Conceptualization RDS practitioners conduct “formative research” before launching a survey, often in partnership with local organizations, with the aims of ensuring the target population is networked, assessing feasibility and logistics, and selecting seeds. For political scientists, conceptualization of the target population and its defining political behavior is likely necessary before formative research because of the hiddenness that characterizes the subject. To advance their field utility and resonance among a survey population,¹⁰ concepts can be approached empirically. Specifically, immersive field research can reveal “actually observed behaviors, insider understandings, and self-reported identities” (Singer 1999, 172). Additionally, interview research can allow one to reconsider or define anew notions of group identity and political behavior among underrepresented populations (Rogers 2013). The resulting concept should be operationalizable with indicators (Adcock and Collier 2001; Goertz 2005), which can serve as eligibility criteria for inclusion in the survey. The overall effort of conceptualization allows our findings and inferences to be understood and assessed.

Mapping the Network At least two of RDS’s assumptions rely on knowledge of a hard-to-survey population that is, by definition, difficult to glean. Assumption 2

posits that the network of a target population should be interconnected enough to become independent of the seeds, which is possible if there are not subgroups within it that will induce homophily by recruiting only within their subgroup. Homophily can be statistically diagnosed from survey data, but its prevalence is worth gauging in advance in order to judge RDS's feasibility. Assumption 3 posits that sampling is with replacement. Yet in practice, participants should be surveyed only once; therefore, it is advised to maintain a sampling fraction that is small relative to the overall size of the target population (Barash et al. 2016).¹¹ Yet knowledge of the size of a hidden population is usually, at best, based on the estimates of key informants, elite sources, and records.¹² Such sources may not proffer accurate accounts of populations engaged in grassroots or illicit processes or may have interests in misstating the size of a population or the nature of its preferences and behavior (Wood 2003). As such, these accounts should be supplemented by the researcher's own efforts.

To do so, one can begin by translating these RDS assumptions into concepts from ethnographic network mapping: assumption 2 relates to *bridges*, or the interpersonal connections, bonds, and activities common to people in a group; assumption 3 relates to *boundaries*, or the bases of inclusion in and exclusion from a network. Interview research and close observation within a community can allow a researcher to grasp the bridges and boundaries that constitute a network, its subgroups and interconnectedness, and even approximations of its size (Trotter II 1999).

Navigating Sensitivity RDS is designed to reach sensitive populations; gauging sensitive matters within surveys demands additional efforts. Immersive field research can help scholars navigate sensitivity in at least three ways, two of which are ably charted in Thachil's (2018) work on "ethnographic surveys": the use of (1) context-sensitive sampling strategies and (2) sensitive questioning techniques. Thachil's "worksites" sampling strategy differs from RDS,¹³ but both are context sensitive and potentially efficient ways of gaining access to a population.¹⁴ I contend that, as a third means of navigating sensitivity, qualitative research of difficult phenomena should supplement an RDS survey. Members of a hard-to-survey population, like those who are vulnerable or engaging in informal or illicit behavior, are especially likely to be protective against outside or seemingly impersonal (i.e., survey) research. Although sensitive questioning techniques within a survey can be helpful, deeper understandings likely stand to be gained. Observation, interviews, and immersion can access the kinds of data that can greatly bolster an RDS survey of a hidden population, including politically sensitive preferences and beliefs (Wood 2007), the role of rumors and silences in narratives of violence

(Fujii 2010), and the use of dissimulation in repressive contexts (Wedeen 1999).

Understanding Respondent Behavior Interviews can also help address selection bias in RDS studies, which are liable to suffer from nonresponse issues that plague contemporary survey research—but at an increased intensity because of hidden populations' wish to avoid detection (Smith 2014). Unit nonresponse is difficult to detect along the respondent-driven chain of sampling; it can be unclear whether a participant chose to recruit fewer than three people, and whether and how many of those potential recruits chose not to participate. As such, many RDS surveys use secondary incentives to encourage successful recruitment. Still, social scientists may lack the capacity or imperative to conduct follow-up surveys that elicit explanations for nonresponse.¹⁵ An alternative approach is for a researcher to remain in contact with the seeds, deepen contact with willing survey participants, and conduct interviews with them as well as with nonparticipant members of the population. These interviews can provide information about sources of nonresponse and help determine whether its causes are nonrandom (Rogers 2013). In addition, this practice can create trustful relationships with key members of the population who can contribute to the survey's success.

Evaluating Causality RDS survey data cannot establish causality, a challenge that characterizes almost all observational quantitative data. Approaches to causal identification have become prominent in contemporary methods literature and include qualitative methods for explicating mechanisms that underlie relations between variables (Brady, Collier, and Seawright 2004; George and Bennett 2005; Gerring 2008). I only add here that ethnographic tools (observation, immersion, and interviews) can be particularly useful for penetrating opaque circumstances and ground-level processes, where hard-to-survey populations may operate (Bayard de Volo and Schatz 2004).

Studying Activist Refugees

In this section, I illustrate the potential of RDS through its application in a study of activist Syrian refugees in Jordan. I first present what we have learned about Syria(ns) since the outbreak of the civil war in 2011 and what we have not and cannot learn using standard survey techniques. I then describe the way I executed an integrative multimethod design that included an RDS survey and the findings that RDS provided to a process-tracing analysis of the relationship between activism and external assistance during conflict.

Refugees typify hard-to-survey and vulnerable populations. Unless a researcher is interested in—and has access to lists of—certain documented groups of refugees (e.g., those registered in formal camps), they can face seemingly

“unassailable barriers” to random and representative sampling (Bloch 2007). Some contend that survey research is anyway likely to “completely miss” the defining aspects of refugee experiences (Rodgers 2004). Syrians now constitute the largest population of refugees at a time that, globally, historic numbers of people are displaced from their homes.¹⁶ So there has nevertheless been a recent expansion of political science scholarship on Syrians and the uprising-cum-war that led to their displacement.

Among field researchers, the expansion is largely attributable to the refugees themselves. With the country closed off by physical danger and authoritarian restrictions, refugees—who primarily reside in neighboring Lebanon, Turkey, and Jordan—have become conduits for the study of Syria (Corstange and York 2018; Koehler, Ohl, and Albrecht 2016; Leenders and Mansour 2018; Schon 2016),¹⁷ as well as subjects in their own right (Parkinson and Behrouzan 2015; Zeno 2017). Pearlman’s work studies refugees as conduits, illuminating Syrian experiences of authoritarianism, revolution, and war (2017), and as displaced subjects, exemplifying the value of qualitative interviews, via snowball sampling, for theory building and causal process tracing (2016a; 2016b). A small number of scholars have managed to conduct quantitative surveys of Syrians. In Lebanon, they have gained access to lists of registered refugees from the UN¹⁸ and probed Syrians’ attitudes on sectarianism and civil war factions (Corstange 2018; Corstange and York 2018), and their propensities to mitigate community problems and to return to Syria (Masterson 2018; Masterson and Lehmann forthcoming). In Turkey, scholars gauged attitudes toward conflict resolution by purposive sampling of neighborhoods with high concentrations of Syrians and random sampling at the household level (Fabbe, Hazlett, and Sinmazdemir 2019). In almost all cases, these studies’ findings defy popular and scholarly expectations.

To my knowledge, the only social-science survey of Syrian refugees in Jordan was conducted by Arab Barometer (2018), which found that Syrians do not feel represented by any political party. Yet scholars have been studying Syrians in Jordan in other ways, and some are shedding light on refugees’ political mobilization. Through qualitative interviews and participant observation, they have demonstrated how women transferred their uprising activism from Syria to Jordan (Alhayek 2016); how Syrian civilian associations navigate Jordanian security imperatives while undertaking varieties of activism (Montoya 2015); and how relations between diasporic diplomats, activists in refuge, and those inside rebel-held territory are affected by states and international agencies (Hamdan 2017). These studies collected data in urban areas, where the vast majority of Syrians in Jordan reside.¹⁹ Clarke (2018), harnessing event data obtained from the UN, has demonstrated that encamped Syrians in Jordan have also mobilized contentiously. In addition to identi-

fying diverse manifestations of nonviolent engagement, these studies have highlighted the networked nature of their study populations. Further, they fit into recent literature that has demonstrated—qualitatively and at aggregated levels of analysis—the ways in which refugees enact agency nonviolently (Holzer 2012; Murshid 2014), in contrast to the violence and victimhood often predicted of them.

Syrian activists are hard to survey quantitatively because they are not documented on population lists from which we can sample, are a small fraction of the overall Syrian refugee population, often participate in informal associations and endeavors, and are more situated in cities than in bounded camps. But the studies cited earlier illustrate a population transforming and being transformed by civil war processes. Can we assess emerging theories with new microlevel data? Probability-based approaches would not allow us to do so: any lists, if they existed—for example, of an organization’s employees—would be woefully incomplete; the creation of a list would be ethically unacceptable given the variety of state and nonstate intelligence agents operating in and around the country; and Syrians’ activism usually has not been enacted en masse in forms that could be intercepted. A multimethod research design—integrating RDS with qualitative research tools—allowed me to survey them despite those obstacles.

“To keep the Syrian issue alive”: Using RDS to study Syrian Activists in Jordan

By most accounts, the 2011 Syrian uprising was a fledgling phase of the conflict that repression crushed, armed insurgency overtook, and emergency needs rendered obsolete. Violence displaced millions of Syrians, and for most refugees, what became a protracted exile was characterized by coping, resilience, and foreclosed opportunities (Khoury 2015). Yet throughout the war, Syrian activists continued to engage nonviolently in a wide range of activities on behalf of the Syrian cause, both inside Syria and in refuge.²⁰ Their activism evolved and shifted, but it persisted and, in some cases, even became extensive. What explains trajectories of civilian activism in contexts of civil war? My research employs process tracing at the mesolevel in and around Syria to answer this question and to understand conditions for and changes in wartime activism. To bolster it, I sought evidence that would support descriptive inference at the individual level across a population that was hidden, which led me to RDS.

Conceptualizing Activism

Through observation and interviews, I found a wide repertoire of Syrians’ civil action in Jordan, including fundraising for rebels’ families, documenting wartime violations, providing humanitarian support for refugees, and journalistic reporting on the conflict. Syrians referred

to acting on behalf of the Syrian cause in any of these ways as activism. In its breadth, this concept fits scholarly notions of nonroutine action aiming to engender change in people's lives (Bayat 2002; Martin 2007),²¹ is resonant among Arabs (Schwedler and Harris 2016), and is useful in a field study seeking to capture a population engaged in a range of activities across the border of a civil war state. It is also operationalizable: eligible survey participants would be Syrians in the Amman Governorate who had "engaged in political, social or economic activism on behalf of the Syrian cause" since their arrival in Jordan.²²

Network Mapping

My repeated immersion over three years suggested that while the networked nature of activists was constant, the network's boundaries were shifting: many Syrians were engaging in activism, and more were doing so from the capital Amman, rather than in northern border cities. The capital, then, would need to be the geographic area for the survey to ensure a small sampling fraction (assumption 3). And although the nature of their activities was also changing, becoming more formal and oriented toward humanitarianism, individuals seemed to move seamlessly from one action to another—for example, from citizen journalism to development assistance—embodying bridges in the network and suggesting that the network remained singular (assumption 2). Finally, in conversation with interlocutors and ordinary refugees, I gathered that activists were generally young and a small fraction of all Syrians in Jordan, allowing me to roughly gauge the size of the target population.²³

Design and Sensitivity

The Jordanian government's restrictiveness and selectivity vis-à-vis Syrians generally, and political activists particularly, demanded circumspection. Before the 2016 survey launch, members of the target population with whom I had developed trustful relations—rather than elites or institutions—assisted me by evaluating the protocol and instrument. The mode of the survey was "phone" based and "computer" assisted: recruitment, appointments, and interviews were carried out via the encrypted messaging and calling applications WhatsApp and Viber, and we recorded responses on a tablet device. These mobile applications were widely trusted, hugely popular, and affordable; they allowed us to maintain confidentiality, emulate the social patterns of activists, and reduce physical burden.²⁴ Recruits received messages from their recruiter peers that included information about the survey and a unique non-identifying ID linking them to each other. On completion, we offered participants top-ups to their mobile data plans.²⁵ A benefit of the phone-based approach was that respondent ties were likely reciprocal, given shared contact information (addressing assumption 1). Meanwhile, I explored some lines of inquiry—such as

cooperation with armed groups or proscribed political ones—in qualitative research.

Sampling

The survey began with five seeds selected for diversity in gender, age, and types of activism, with the objective of reducing their bias on the final sample (Gile and Handcock 2010).²⁶ Their engagements ranged from war-related journalism to providing psychosocial support for refugees; they worked formally or informally with Western organizations, Syrian-led ones, or independently. The survey was ultimately completed by 176 participants over the course of 20 recruitment waves in a three-month period,²⁷ a smaller than desired sample size but with a considerable number of sampling waves that, in theory, limits the bias of the seeds on the sample (see figure 1).²⁸

Respondent Behavior

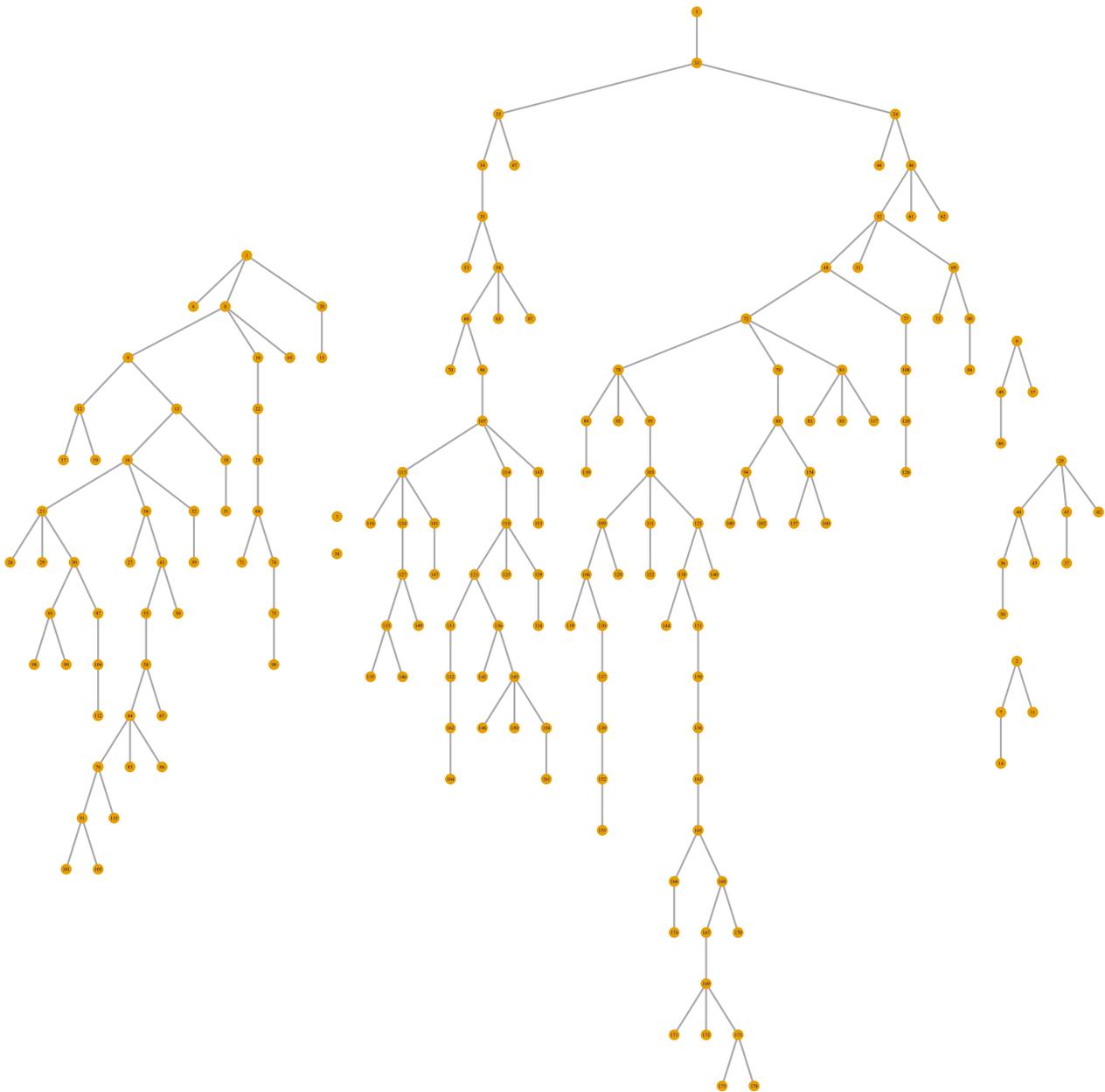
To assess participation and nonresponse bias, I carried out interviews with members of the target population. Many participants expressed enthusiasm for a study that would shed light on their civil actions. Still, others identified three causes for slow recruitment: busyness, study fatigue (refugees, often probed by humanitarian organizations, feel they are rarely rewarded), and distrust. The first two are common explanations for unit non-response that did not invoke serious concerns about selection bias. What about distrust? The survey itself revealed that feelings of trust are limited among activists: only 12% [95% CI: 1.4, 22] feel that most people can be trusted; the remainder feel a need to be careful about others. My qualitative research suggested that activists were cautious about perceptions and misperceptions of their engagements in a high-security context. That research, which captured sensitive and political activism extensively, could counterbalance the selection bias of the survey.

Analysis

The survey asked questions about respondents' socio-demographic backgrounds, activism, and preferences and ambitions. Table 4 presents unadjusted and adjusted statistics on select descriptive characteristics to demonstrate inverse-inclusion probability weighting. It also shows that the population is relatively young and well educated.²⁹

RDS proved an appropriate sampling strategy. Activists are networked: the median degree reported was 12, meaning that respondents personally knew and were in contact with 12 members of the overall target population, on average.³⁰ Further, these networks are central to their activism: 83% [72, 93] of respondents reported that they cooperate with Syrian activists in Jordan or in Syria to carry out their work.

Figure 1
Recruitment tree.



RDS also offered evidence, or causal process observations, to support my exploration of a linkage between aid and activism. Scholars of civil resistance have noted that external assistance can advance a movement. Yet, although the abundant assistance targeted at Syrians seems to have mobilized them, it may also have changed the nature of their activism. Specifically, I consider how resources provided by external actors generate processes that lead to the spread and formalization of civilian activism.

By virtue of the survey design, all of the participants had engaged in activism. Surprisingly, less than half did so during the uprising in Syria. The survey thus provides evidence that many Syrians entered into activism only after arriving in Jordan, meaning there apparently exist mobilizing opportunities for activism despite Syrians' vulnerability and the government's political circumspection. I argue that this opportunity structure is the humanitarian and developmental response in Jordan:

Table 4
Descriptive Sample and Population Percentages with 95% Confidence Intervals

| | Sample (%) | Population |
|-------------|------------|-----------------------|
| Sex | | |
| Male | 68.2 | 66.6% (56.2, 77.0) |
| Female | 31.8 | 33.4% (23.0, 43.8) |
| Education | | |
| Elementary | 0.6 | 0.8% (-0.7, 2.26) |
| Preparatory | 4.5 | 4.8% (-1.4, 11) |
| Secondary | 48.3 | 46.0% (32.1, 59.8) |
| Institute | 9.7 | 8.9% (2.7, 15.0) |
| Bachelor's | 33.5 | 37.0% (22.6, 51.3) |
| Graduate | 3.4 | 2.6% (1.3, 3.9) |
| Age | | |
| 18–23 | 31.3 | 27.3% (15.4, 39.3) |
| 24–29 | 38.1 | 40.1% (26.0, 54.2) |
| 30–35 | 19.9 | 18.7% (11.1, 26.2) |
| 36+ | 10.8 | 14.0% (3.9, 24.0) |

Note: n = 176.

today's humanitarian responses generate a process of what I call *feeding* activism. The response to the crisis in Syria resembles global trends in humanitarian assistance: aid has increased enormously over time, as have its purposes, the quantity and diversity of its purveyors, and its turn toward local civil society actors (Barnett and Weiss 2008; Duffield 2001; Risse 2013; de Waal 1997), contributing to individual and organizational entry into and expansion of activism.

Another interesting finding is that two-thirds of activists worked formally with organizations (international, national, and local), apparently despite Jordan's restrictions on the employment of Syrians. This observation fits into a process of *formalizing* that is, I contend, generated by humanitarian assistance. The modern provision of aid is characterized by rationalization, resulting in the bureaucratization of actors and the activities in which they are involved, including grassroots ones (Ferguson 1990; Mundy 2015; Sending and Neumann 2006).

The survey also demonstrates that Syrians are converging on certain forms of activism and away from others in which they had previously participated, even while in Jordan. Figure 2 indicates that Syrians are engaged foremost in humanitarian relief, development, and media and

no longer in protest, institution building, fundraising, and advocacy. This may well fit into a process whereby external aid *fragments* activism. In aid contracting, multiple principals shape the distribution of resources on which populations of organizations are dependent, leading them to focus more on survival than collective or transgressive action (Bush 2015; Bush and Hadden 2019; Cooley and Ron 2002; Hoffman and Weiss 2006).

The causal evaluation of these findings takes place within the larger process-tracing project. As part of an integrative multimethod research design, qualitative tools support RDS, and RDS supports the case study.

Evaluation

In this section I situate these substantive findings in an assessment of RDS's mechanics and performance. For diagnostics, consider the gender variable as a simple illustration. As shown in table 4, about two-thirds of Syrian activists in Jordan identify as male. Were females sufficiently represented by RDS? Social norms that foster same-sex friendships and greater male participation in the public sphere may (1) lower women's inclusion probability in a survey or (2) limit their participation in activism. We would not want the first issue to mask the second, as likely occurred in a snowball sample survey of the Syrian political opposition in which respondents were only 15% female (IRI 2012). RDS improves on the representativeness of such a sample, and reported network sizes reveal why: the mean network size of male respondents was 18.8, whereas that of females was 13.4—in turn, females were given, on average, slightly larger weights in the analysis. Thus,

Figure 2
Percent of population previously and most recently engaged in various types of activism (95% CI)

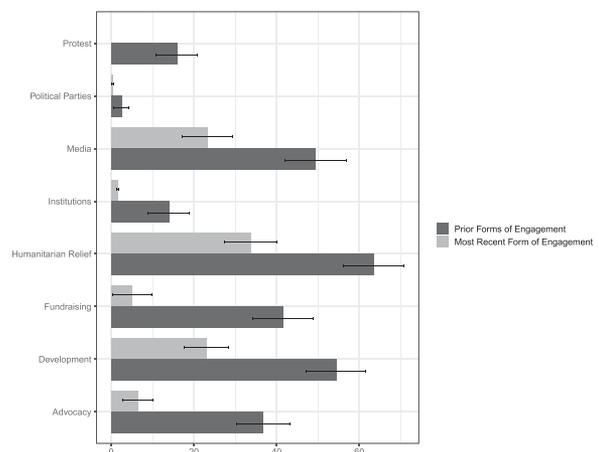
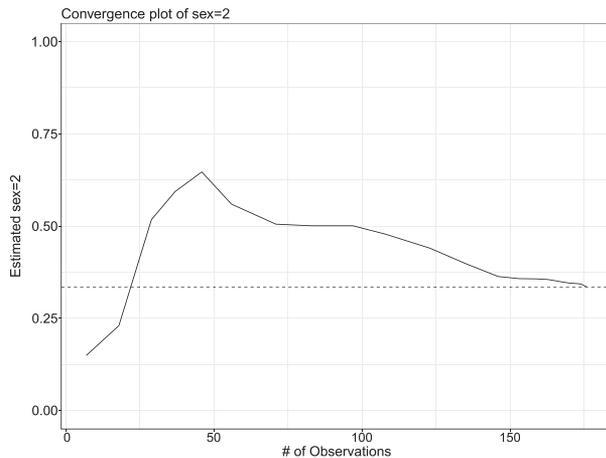


Figure 3
Convergence of sex to female (2).



although their participation in activism is less common than males, RDS ensures that this finding is not determined by their lower inclusion probabilities.

We can use statistical tools to explore this matter further. Assumption 2 expects that the network is a single component (a priori, considered via ethnographic network mapping). Recruitment homophily is the tendency of people to enlist participation from people similar to themselves; a statistic equal to 1 indicates no homophily. On sex, homophily registers at 1.23, meaning more males were recruited than expected due to chance alone. This statistic is modest, but should nevertheless encourage further exploration of relevant differences between men and women. A diagnostic tool, a convergence plot, indicates whether estimates of a trait stabilized and became independent of the seeds. Figure 3 suggests that the gender estimate did indeed begin to stabilize. A larger sample size likely would have ensured complete convergence on the proportion of women in the population.

How did RDS perform overall? The sample size was relatively small and confidence intervals wide. Future applications could benefit from technical and resource improvements such as a larger research team and the use of secondary incentives. Yet leveraging trustful relations between members of a hard-to-survey population did lead to a successful application of the method. The survey achieved a systematic accounting of engaged Syrians that is compatible with emerging research on Syrians' mobilization, reflecting the diversity of manifestations found separately by previous studies. It fostered and advanced representation by capturing activism in its most high-profile forms—such as documentation of human rights violations—as well as activism that is lower in profile, like provisioning aid for young refugees, enacted by those who

wished to effect change but whose networks, political propensities, and levels of experience were modest. That the results are generalizable instills confidence in their use for describing a phenomenon about which we know little, but which is, arguably, intrinsically important (Gerring 2012): a vulnerable population acting under extraordinary circumstances to effect change. Their political behavior is neither marginal to civil war processes nor to transnational responses to conflict.

Conclusion

Sampling frame issues affect survey research even in contexts of high data quality, where solutions like frame combination can be feasible because some record of the population exists. But when data quality is low and a population is hard to survey, understanding, and applying, alternative tools is necessary and appropriate. RDS is a method for sampling and analysis that leverages trust between members of hidden populations to produce representative samples, conclusions about which can then be inferred to the population because of weighting based on respondents' degree-based inclusion probability. Parting ways with the purities of probability sampling but advancing statistically on nonprobability approaches, RDS may be a “good enough method” for surveying: a method that allows both for flexibility and rigorousness in difficult contexts (Firchow and Mac Ginty 2017). It can be better if deployed within an integrative multimethod research design. Is it then good enough for political science?

When evaluating a novel method, we should ask whether it advances our knowledge and theories. In my experience, RDS did both. The survey accessed activists whom I may not have reached on my own because their activism and propensities were low in profile; their traits may not have otherwise been accurately represented at their population levels. In so doing, RDS advanced my ability to theorize the causes and consequences of activism's trajectories by ensuring a comprehensive understanding of individuals' backgrounds, engagements, and preferences.

An integrative RDS research design can provide data at the microlevel that advances descriptive inference. Description is often subordinated to causal inference in mainstream political science (Gerring 2012). But it is an end worth pursuing, especially when we know little about a phenomenon—as is almost always the case regarding the political behavior and preferences of hard-to-survey populations—and is a crucial step toward making compelling causal inferences.

Notes

- 1 As a signal of ubiquity, consider that nearly 90% of political scientists who conduct field research in the Middle East have used this method (Clark 2006).

- 2 A review of peer-reviewed studies collecting biological specimens counted 222 RDS surveys as of 2013 (Johnston et al. 2016). A review of RDS for biological and behavioral surveillance of populations at risk for HIV counted 123 surveys as of 2007 (Malekinejad et al. 2008).
- 3 I searched Proquest's Worldwide Political Science Abstracts and Sociological Abstracts databases using terms "respondent driven," "respondent-driven," and "RDS." These searches were supplemented by Google Scholar, where I focused on "political science" works that cited Heckathorn (1997) to ensure coverage in the discipline. I eliminated irrelevant results (e.g., those that reference RDS but do not claim to be using the method) and those that discuss only methodology, study a nonhidden population, use simulated data, perform secondary analyses, or collect biological or behavioral data related to HIV risk.
- 4 Refer to the Supplementary Appendix for a detailed version of the review and bibliography of works included.
- 5 RDS draws on network theory's "small-world" insights, which suggest that all nodes in a network can be reached from a few connections (Watts and Strogatz 1998); therefore, members have a nonzero probability of selection into a sample (Heckathorn 2002).
- 6 The accuracy with which people can report their degree is a matter of concern. I devised a robustness test that adds random noise to the weights derived from my sample's "true" degree reports and assessed change in the mean square error on a given parameter. As documented in the Supplementary Appendix, I found that small to moderate levels of recall/estimation error are basically harmless; large amounts of error are likely to produce bias. An RDS methodologist finds that degree reports do not bias estimates if respondents uniformly inflate or deflate their reports, because RDS estimators rely on relative rather than absolute estimations (Wejnert 2009).
- 7 Additionally, outliers can be truncated in the analysis.
- 8 For dissenting assessments, see Platt et al. (2006) and McCreesh et al. (2012).
- 9 Secondary surveys are also encouraged to better understand and adjust for deviations from the assumptions in the course of recruitment.
- 10 Gerring (1999) proposes field utility and resonance as two among several attributes of concepts that make them useful.
- 11 Alternatively, Gile's (2011) estimator eliminates the need to meet the assumption by estimating based on successive sampling.
- 12 Recent developments in RDS methodology include promising efforts toward estimating population sizes (Des Jarlais et al. 2018).
- 13 Worksite sampling is akin to intercept sampling (see table 1) and is particularly suited to populations that are occupationally concentrated, which many hidden populations may not be.
- 14 Thachil dismisses the potential of RDS. However—exemplifying the dearth of knowledge of RDS in political science—his dismissal is based on a study that reports using RDS but does not accurately use it. (That study, being unpublished, is not included in the systematic review, but it duplicates the problems of several that are.)
- 15 In HIV-related RDS surveys, the reporting of blood test results can coincide with providing secondary incentives and conducting follow-up surveys.
- 16 As of 2016, there were 65.6 million people forcibly displaced worldwide. Of these, 5.5 million Syrians were refugees, and 6.3 million were internally displaced (UNHCR 2017).
- 17 Corstange notes, "The uprising in Syria has given scholars and journalists unprecedented access to ordinary Syrians, or at least those who have left Syria" (2018, 2).
- 18 UNHCR has counted around one million registered refugees in Lebanon in 2018; estimates of all Syrians are around 1.5 million.
- 19 As of mid-2016, about 20% of 650,000 registered Syrian refugees inhabited camps (UNHCR 2018). Estimates of all Syrians in Jordan are upward of 1.5 million.
- 20 The quote in the title of this section was offered by a survey respondent as an expression of her primary reason for engaging in activism.
- 21 Some conceive of activism primarily as advocacy (Keck and Sikkink 1998). My conception is more encompassing, a choice anchored in an understanding of political behavior as shaped by context—here, political violence and authoritarianism, which can render a wider array of actions nonroutine.
- 22 They would also be 18 years old or older. One criterion for eligibility was not having previously participated in the survey.
- 23 Gile's successive sampling estimator, used in the later analysis, eliminates the need to assume sampling with replacement by correcting for finite population effects. Its use requires information about the size of the target population. I estimated it to be about 3% of the total number of registered Syrian refugees in Amman at the time who were between the ages of 18 and 35, leading me to the figure of 1,500.
- 24 Mobile data in Jordan are cheaper than SMS and calling minutes, so the use of message applications is widespread regardless of sensitivity. As of April 2016, before the survey launch, both WhatsApp and Viber used end-to-end encryption by default; WhatsApp text messages (used for recruitment) and Viber calls (used

for the survey interview) both used 256 encryption keys (Rakuten Viber n.d.; WhatsApp 2017). On our end, a virtual private network was always activated, messages were never backed up, and phone numbers were deleted after completion of the survey and delivery of the incentive. The survey software (Qualtrics Offline) was operated by me or my research assistant on a tablet device in a secure location; the software could not record location information about respondents over the phone.

- 25 Primary and secondary incentives are common in RDS surveys to encourage both participation and recruitment. Restrained by costs, my own study offered only primary incentives.
- 26 Two of the initial five did not recruit within the first two weeks because of personal matters, so two others were added. In a review of RDS surveys, the WHO (2013) determined the median number of seeds was eight, and that an average of 1.6 were unsuccessful.
- 27 The average sample size and number of waves in a review of RDS biological surveys were 325 and 9, respectively (Johnston et al. 2016).
- 28 The sample was smaller than the target size of 313, which was estimated as $n = \frac{p(1-p)}{\text{var}(y)} DE$ where p is the expected proportion, $\text{var}(y)$ is the variance, and DE is design effect, calculated with a conservative proportion estimate of 0.50, standard error of 0.04, and a design effect of 2. Design effect is the ratio of the variance under RDS to that expected for simple random sampling, which has a design effect of 1. A design effect of 2 is usually recommended for RDS (Salganik 2006; WHO 2013); some call for a higher effect (Wejnert et al. 2012).
- 29 Analysis was conducted in both R and RDS-Analyst. RDS II (Volz and Heckathorn 2008) and Gile's successive sampling (Gile 2011) are the two most prevalent estimators in use. Estimates were made using both, and the differences were negligible; only the latter is presented (using population size estimate 1,500).
- 30 The US Centers for Disease Control (2012) reports that "small" degrees are 1 to 3; the WHO (2013) reports that ranges of 3–25 and as large as 250 are valid.

Supplementary Materials

To view supplementary material for this article, please visit <https://doi.org/10.1017/S1537592719003864>

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