

Assessing Egocentered Social Networks in formr: A Tutorial

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Abstract

In psychological science, egocentered social networks are assessed to investigate the patterning and development of social relationships. In this approach, a focal individual is typically asked to report the people they interact with in specific contexts and to provide additional information on those interaction partners and the relationships with them. While egocentered social networks hold considerable promise to investigate various interesting questions at the heart of relationship science and beyond, their implementation can be challenging. This tutorial provides researchers with detailed instructions on how to set up a study involving egocentered social networks online using the open-source software *formr*. By including a fully-functional study template for the assessment of social networks and extensions to this design, we hope to equip researchers from different backgrounds with the tools necessary to collect social network data tailored to their research needs.

Keywords: social networks; online assessment; open source

Introduction

The investigation of social networks, which describe the interactions and relationships among finite sets of individuals, is of interest to researchers from various fields of psychology. When assessing *egocentered networks*, a focal individual is typically asked to self-report information about interaction partners and the relationships to them. This makes it possible for researchers to investigate the patterning of individuals' social relationships, how these relationships may change over time or across life transitions, and how these relationships affect or are affected by the characteristics of the individuals involved (e.g. Asendorpf & Wilpers, 1998; Borschel et al., 2019; Greischel, Noack, & Neyer, 2016, 2018; Zimmermann & Neyer, 2013). Previous research employing egocentered social networks includes investigations into the role of social networks for physical and mental health (e.g., Aschbrenner et al., 2018) and the investigation of specific network types such as social support networks (e.g., Armstrong & Kammrath, 2015), networks in organizations (e.g., Burt, 1992), or networks of potential romantic partners (e.g., Gerlach et al., 2015). The breadth of questions previously tackled by employing egocentered social networks demonstrates the value of this tool for different fields of psychology and relationship science in particular.

While egocentered social networks can successfully be assessed in face-to-face or telephone interviews, there are several advantages of assessing them via online surveys. Online surveys allow researchers to reach out to large, potentially diverse, as well as specialized samples, and as participants do not need to come into the lab, the cost and effort of conducting research may be reduced and participants' experience of anonymity may be facilitated (Kraut et al., 2004). Furthermore, online implementations are flexible in the sense that they allow for an automated adaptation of instructions or questions based on earlier responses. This is of particular importance for the assessment of social networks, as they often require further questions about the network members to be adapted to the number of people listed or to their names and attributes.

Setting up the assessment of social networks from scratch might pose a challenge to researchers, as such adaptations often involve some complexity that may be hard or even impossible to implement using conventional online survey software. Therefore, the aim of this tutorial is to provide detailed instructions on how to implement online assessments of egocentered social networks using *formr* (Arslan, Walther, & Tata, 2019). *Formr* is an open-source software, which allows for an easy sharing of reproducible study setups and readily entails all of the functions needed to assess basic as well as more sophisticated egocentered social networks. That is, *formr* makes it possible to easily assess more information about the people listed as network members. For more sophisticated designs, *formr* also allows for the assessment of networks in a longitudinal manner, for an additional peer-assessment of the people who were listed as network members, or for the incorporation of other existing Javascript based social network assessment tools (e.g. graphical tools as the Graphical Egocentered Network Survey Interface (GENSI; Stark & Krosnick, 2017)). Furthermore, in *formr* personalized feedback on the basis of participants' responses can be created, which might be a helpful tool to motivate participants to engage in a study.

It would lie beyond the scope of our tutorial to explain all of these options in detail. Therefore, we will focus on explaining how to use *formr* to assess a basic egocentered social network, and how to implement looped and network-contingent further questions as well as network-based feedback. For the more advanced readers, we also include a short discussion of how the graphical tool GENSI (Stark & Krosnick, 2017) can be incorporated in *formr*.

Disclosures

All materials used in this tutorial have been made publicly available via the OSF and can be accessed at <https://osf.io/sgkwz/>.

Tutorial: Assessing Egocentered Social Networks in formr

Sample Study and Information about formr

Sample Study. To guide you through the process of building up a study capturing egocentered social networks in formr, we have created a sample study designed to assess social *support networks*. We will use this study to guide you through the different steps of implementation and, at the same time, provide you with a template you can later use as a starting point to create your own social network study.

In our sample study, we seek to answer the following research questions: How are people's personalities related to aspects of their support network (e.g., the size of the network, the amount of contact to the members of the network, and the experienced closeness to those members)? And how does the degree of similarity between a person's own personality and the network members' personalities predict the amount of contact and experienced closeness? To get at these questions, in our sample study, we will assess information about the focal participant and their personality, about the people in the focal participant's support network, about the amount of contact and experienced closeness to the network members, as well as about the personalities of the network members.

In the following, we will explain how we gather this kind of data using formr in our template study. In particular, we will focus on the assessment of the network itself and ways of collecting more information about the people listed there by referring back to data provided by participants earlier in the course of the study. With this, we aim to equip you with the basic tools needed to implement social network assessments in formr and enable you to adapt our templates to your own research needs. Before we do so, let us give you a brief introduction to the formr framework.

About formr. Formr is a non-commercial, online open-source survey framework (Arslan et al., 2019) that allows for the implementation of simple cross-sectional surveys as well as more complex study designs such as longitudinal, dyadic, or experience sampling

studies. A freely usable version of formr is accessible at formr.org, hosted at the University of Goettingen, but self-hosting the software is possible too.

Formr consists of three main components. The first component is the *survey framework*, i.e., the *item tables* in which the information to be gathered is specified. Item tables are uploaded to the survey framework in the form of spreadsheets of different possible file formats (e.g., Excel files, Google Sheets). The second component is the *study control framework*, also referred to as the *run*, in which the overall design of the study is specified. As part of the study design, the study control framework allows setting up automated invitation or reminder emails and personalized feedback. Using formr necessarily includes using the study control framework (i.e., a run), although it is possible to use the study control framework without using the survey framework, for example when another data collection module is used instead.¹ The survey and study control frameworks are written in PHP. The third main component of formr is an utility R package (Arslan, 2018) which is independent from the two PHP based components. Since a web-based API for the programming language R is integrated in formr via OpenCPU (Ooms, 2014), researchers can enable complex features by executing R code in the surveys as well as in the study control framework (the run). For example, by using the packages rmarkdown (Allaire et al., 2018) and knitr (Xie, 2018) question texts and sequences can be adapted to information given earlier by participants, while by using the package ggplot2 (Wickham, Chang, et al., 2018), graphical feedback can be created on the basis of participant's answers.

For further information on formr, please see Arslan et al. (2019), the documentation section on the formr website (<https://formr.org/>) and the formr Wiki on GitHub (<https://github.com/rubenarslan/formr.org/wiki>).

¹For instance, it would be possible to implement components of one's study in other survey frameworks such as SoSciSurvey (Leiner, 2014) or Limesurvey (Limesurvey GmbH, 2012) and integrate these into a larger study built in formr.

Steps of Implementation

We will now have a look at the different steps of building up a fully functional study in formr for the assessment of egocentered social networks. We start with some questions to consider prior to implementing your study, and then show you how to create your own formr account. Next, using the template spreadsheets for our sample study, we will illustrate how to specify the information to be gathered as items in a survey spreadsheet. We continue by explaining how to upload the survey sheets and how to configure the settings in the study control framework (the run). Finally, we will look at how to test the study, before you can eventually run it. As add-ons, we will also show you how to implement personalized feedback and, for the more advanced readers, how to incorporate the graphical network tool GENSI (Stark & Krosnick, 2017).

Considerations in advance. Before starting to implement your social networks study in formr, there are a few questions you should consider. First of all, you should ask yourself what kind of egocentered social network you want to assess. Put differently: Which kinds of social interactions are of interest to you? For example, you could be interested in networks of *close associates* (i.e., networks of people important to the focal person), *exchange networks* (i.e., networks of people providing material or symbolic support), *interactive networks* (i.e., networks of people interacted with in different contexts), *role-relation networks* (i.e., networks defined by social roles) or *global networks* (i.e., all people one knows; Milardo, 1992; van Sonderen, Ormel, Brilman, & van Linden van den Heuvell, 1990). In our sample study, we want to assess a subtype of an exchange network: The people our focal participants would ask for support in different situations.

A second consideration is how you would like to guide your participants in the creation of their networks. One way of doing so is using *name generators* (Marsden, 1990). Name generators usually are (a series of) questions or situational prompts supposed to guide participants in coming to think of certain people. For example, if you wanted to assess a

broad interaction network, you could list different life contexts (e.g., university, work, recreational activities) and ask for the people typically interacted with in these contexts (Bidart & Charbonneau, 2011). If you were interested in a more narrow network, you could ask about the people who impact participants' attitudes, behaviors, or wellbeing the most (McCallister & Fischer, 1978). In our sample study, to assess support networks, we provide participants with a set of situations which could require the support of others and ask which people they would typically ask for help in these situations.

Third, you will need to specify how many people your participants will be allowed to list as their network. For a first orientation, you may want to consult previous studies that have employed egocentered networks (e.g., Armstrong & Kammrath, 2015; Aschbrenner et al., 2018; Asendorpf & Wilpers, 1998; Borschel et al., 2019; Greischel, Noack, & Neyer, 2016, 2018; Marquez et al., 2018; Wyngaerden et al., 2019; Zimmermann & Neyer, 2013) for typical as well as maximum network sizes. Another way to approach this is to pilot your method of assessing your network of interest (including your name generators) in a small sample of face-to-face interviews. By piloting your social network assessment with people closely mirroring the population you want to target with your larger online study, you should get a good handle on what might constitute an appropriate maximum network size. For our sample study, we decided to let participants list a maximum of 12 people they would turn to when in need of support. No matter what, you should make sure that the amount of people who can be listed fits the amount of people your instructions or name generators make your participants think of. In addition, depending on the depth of information you want to gather about each of the network members afterwards, you may or may not have to restrict yourself to having participants list fewer (maybe only the most important) network members or you may want to draw a random selection of listed network members for further in-depth information collection.

This leads us to a fourth important consideration: What kind of additional information on the network members do you want to gather and with which measures? Such additional questions are usually referred to as *name interpreters* (Marsden, 1990). For our sample study, apart from having our participants rate their own personalities, we decided to ask them about how they perceive the personalities of the people in their network as well as about the amount of contact and experienced closeness to those people. Again, and complementing what we outlined above, if you allow a lot of people to be listed, you may have to cut down on the amount of additional information being collected.

Finally, you may want to consider rewarding your participants with a personalized feedback upon completing the study. For a longer survey, this may be a good way to keep your participants motivated throughout, and formr readily provides the possibility of giving personalized feedback based on data gathered during the course of the study. In our sample study, we decided to provide participants with graphical feedback on their Big Five personality traits as well as with feedback regarding their social network. In particular, participants also received graphical feedback about how they perceive their own personality compared to how they perceive the personalities of their network members, and how the time they have known their network members is related to how close they feel to them.

Step 1: Creating a formr account. Now, let us get started with the implementation in formr. In order to create your own studies in formr, you need an administrator account. To get an account on the public instance, please go to <https://formr.org/register>. Upon successfully submitting your email address and a password on this page, you should receive an email asking you to confirm your email address. As described in more detail on the registration page, you will need to send a short email to one of the formr authors after registering.² After checking your email and academic affiliation, the authors will then grant

²Another possibility to upgrade an account to an account with administrator rights would be to use a so-called referral token. Such referral tokens may come in especially handy if you, for example, use formr in your teaching and want to enable a whole group of students to quickly start out with administrator rights for their own accounts. If you want to use a referral token, please contact the formr authors.

you administrator rights. You will now be able to log in with your new account and start setting up your own study.

Step 2: The survey spreadsheet. To get started with your first formr study, you will need to create a survey spreadsheet. The survey sheets for our sample study can be downloaded as Excel files from the “Spreadsheets“ folder on the tutorial’s OSF page (<https://osf.io/sgkwz/>). Please save the files under their preset names, as we are using these names to refer back to items in the spreadsheets (e.g., when creating adapted questions or feedback). If you change the file names, you will have to adjust each of these references according to the new names. As you can see, the spreadsheet folder on the OSF contains multiple spreadsheets; together, these spreadsheets make up a complete and fully functional survey when embedded in a run. In the following, we will use these survey sheets for our tutorial.³ Let us start with having a look at the survey spreadsheet defining the part of our sample study that contains the assessment of the social network. To understand what we are going to achieve with this spreadsheet, see Figure 1, which shows what the page we are going to create with our spreadsheet will look like to participants.

³Please note that some of the spreadsheets contained in the OSF folder (i.e. “networks_template_demographics”, “networks_template_personality_self”, and “networks_template_personality_others”) will not be discussed explicitly in this tutorial, as all functions used there will already have been covered by looking at the sheets regarding the social network assessment. We nevertheless included them in our template, as our aim was to provide a complete and fully functional study template. The sheets include an intro to the study and demographic questions, as well as questions about the focal participant’s personality and the perceived personality of the network members.

Figure 1

Part of the formr user interface for assessing the social network

Your social network

In the following part of the study we would like to learn more about your **social network**. We are especially interested in the people you would turn to in times of need. Therefore, we would like you to list all of the people in your social network you would ask for **support** in different situations below.

You can use your their real names as well as nicknames or shortcuts. Since we will ask you some more questions about the people in your network later on, you should be able to remember which person you were referring to by which name. For the same reason, please do not list two different people under the exact same name.

All information you enter about the people in your social network will be stored securely, treated confidentially, and only be used for scientific purposes.

You can decide how many people you want to list, but you will not be able to list more than 12 people. Please use the + and - buttons to add or remove listings.

Caroline	36	female	friend
Name	Age (in years)	Sex	This person's relation to you

Do you want to add another person?

Note. Fictional information about a person called Caroline was added as the first listing.

Figure 2 depicts the survey sheet “networks_template_network_part1”, which corresponds to the interface you see above. The basic structure of a survey sheet is that it contains a number of columns with predefined names: In the *type* column, you specify what kind of item you are creating (e.g., plain text, text input, multiple choice question), whereas you name your item in the *name* column, and specify its exact wording in the *label* column. The *class column* is typically used to control your items’ visual appearance (e.g., by adjusting width or alignment of your text).⁴

Creating a heading and instructions. As you can see in Figure 1, the network assessment page starts with a heading and the instruction to list names and other information

⁴Please note that we will not discuss these visual styling options in detail in this tutorial (and therefore we will not explicitly explain the classes used in our sample spreadsheets). Please have a look at the documentation section on the formr website (<https://formr.org/>) for more information on classes.

about the people one would ask for support. To create items simply containing text for a heading and an instruction, in row 1 and 2 of Figure 2, we define the item types as “note” in the type column and put our text into the label column.

Spontaneous retrieval of the social network. Figure 1 further shows that the instructions are followed by input fields, asking for the name and some further information about the first person listed by the participant. We will refer to the people listed in the item names as P1, P2, and so forth, depending on the order they were listed in. In Figure 2, the input items for the first person are defined in rows 3 to 6. In row 3, we ask for the person’s name, which can be added into a text input field with a maximum of 50 characters allowed. To do so, we define the item type as “text 50” in the type column. In row 4, we ask about the person’s age, which can be added as a whole number between 12 and 99 (type: “number 12, 99, 1”). In row 5, the person’s sex is to be chosen from a selection of predefined choices (type: “select_one”). To define choices for your items, you have to navigate to the *choices* table of the survey spreadsheet. Your survey spreadsheet consists of two different worksheets, one labeled *survey* (this is the part of the spreadsheet we were looking at so far), while the other one is labeled *choices*. You can navigate between the two worksheets by clicking on their respective tabs in the lower left corner of the spreadsheet. In the choices worksheet, you will find the choices table, where the *name_list* column contains the names of your choice lists, while you set the choices names (or values) in the *name* column, and their labels in the *label* column. Have a look at Figure 3 to see the choices worksheet of our survey spreadsheet. For our sex item, we are using the choice list “sex_list”, by referring to this list in the type column of row 5 (by putting “sex_list” after “select_one”) in the survey table of our survey spreadsheet. In row 6 of the survey table, we then define a similar item to ask for the relationship the participant has with the listed person. Again, we refer to a list of predefined choices (“relation_list”), which is defined in the choices table (as depicted in Figure 3).

In our sample study, at this point, this is all we want to know about each person in the network. Thus, we continue with defining the same questions for the next person who is going to be listed (and whom we are going to call P2, as mentioned earlier). To do so, we can copy rows 3 to 6 and insert them below, changing only the item names in the name column by replacing P1 with P2 for all items, as shown in rows 7 to 10 of Figure 2. In our sample study, participants are allowed to list 12 people. We thus have to repeat this step another 10 times, always changing the P-count in the item names by one, until we get 12 sets of questions. Since all of these questions follow the same logic, Figure 2 only shows the items for the first two people listed.

Now, if we left the survey sheet like this, participants would see the four different questions 12 times upon entering the page. It would look nicer though, if, as shown in Figure 1, the questions would only show up once for the very first network member to be listed and additional questions for more network members would only appear when participants in fact wanted to list more people. To enable this, we create a counter that increases its value by one if participants click a “+” button and decreases by one if participants click a “-” button. To do so, we add a new item of the type “number” and with the class “counter”, as done in the last row of Figure 2 for the item named “counter_SN”. To specify the counting procedure so that for each click the counter will increase by one until it reaches the value of 12, we put “number 1, 12” into the type column. To set the starting point of the counter as one, we put “1” into the *value* column of this row. Now, our next step is to use the *showif* column to specify for which values of the counter the question items are to be shown. Since the questions about the first person to be listed are supposed to appear upon entering the page, we can leave the *showif* column for rows 3 to 6 in Figure 2 empty. For the questions about the second person (rows 7 to 10) to show up only after the “+” button has been clicked once, we specify that these items are only shown if the value of the counter is bigger than one (since the counter starts at one, clicking it once makes its value become two) by putting

“counter_SN > 1” in the *showif* column of these rows. Finally, we have to repeat this step for all other input items, always increasing the value after the more-than-symbol by one for each new set of questions.

Figure 2

Survey worksheet defining heading, instructions and items asking about the people in the social network, as well as a counter keeping track of how many people have been listed

class	type	name	showif	value	label	optional
	note	instruction_socialnetwork_heading			###Your social network	
	note	instruction_socialnetwork			In the following part of the study we would like to learn more about your __social network__. (...)	
clear right150 align_horizontally select2 label_as_placeholder row_height_40	text 50	name_P1			Name	
right150 align_horizontally select2 label_as_placeholder row_height_40	number 12,99,1	age_P1			Age (in years)	
right150 align_horizontally select2 label_as_placeholder row_height_40	select_one sex_list	sex_P1			Sex	
right150 align_horizontally select2 label_as_placeholder row_height_40 space_bottom_20	select_one relation_list	relation_P1			This person's relation to you	
clear right150 align_horizontally select2 label_as_placeholder row_height_40	text 50	name_P2	count_SN > 1		Name	
right150 align_horizontally select2 label_as_placeholder row_height_40	number 12,99,1	age_P2	count_SN > 1		Age (in years)	

right150 align_ horizontally select2 label_as_ placeholder row_height_40	select_ one sex_list	sex_P2				
			count_SN > 1		Sex	
right150 align_ horizontally select2 label_as_ placeholder row_height_40 space_bottom_20	select_ one relation_ list	relation_P2				
			count_SN > 1		This person's relation to you	
... repeat the four rows another ten times for each person allowed to be listed. Make sure to increase the numbers in the variable names and show if column by 1 for each new person.						
clear counter space_bottom_60	number 1,12	count_SN			Do you want to add another person?	1

Note. (...) = content of items abbreviated.

Figure 3

Choices worksheet defining the preset choice options

list_name	name	label
sex_list	1	female
sex_list	2	male
sex_list	3	other
relation_list	1	acquaintance
relation_list	2	colleague / work related
relation_list	3	friend
relation_list	4	romantic partner
relation_list	5	spouse
relation_list	6	parent
relation_list	7	sibling
relation_list	8	child
relation_list	9	other family member
relation_list	10	other
yesno_list	1	no
yesno_list	2	yes

Cued retrieval of the social network. At this point of the study, the participants should have listed the people they spontaneously thought of after reading the first instructions. To make sure that all people relevant to the network in question have been listed, the participants were further given name generators, as shown in Figure 4, unless they had already listed the maximum amount of 12 people.

Figure 4

User interface showing the name generators, which appeared one after another upon checking the box next to the previous instruction or name generator

Are you sure you have listed all of the people you would ask for **support**?

To make sure you didn't forget anyone, we will now show you a few examples of situations in which you could need support sometimes. If these situations remind you of anyone else you have not listed yet, please add them to the list above.

Please check the box to the right to see the situations.



Whom would you turn to if you needed **emotional support**, e.g. if you needed someone to talk to or someone to comfort or encourage you?

If this makes you think of another person, please add them to the list above.

If you have listed all the people this makes you think of, please check the box to continue.



Whom would you turn to if you needed **instrumental support**, e.g. if you needed someone to give you a ride, help you repair your bike or borrow you money?

If this makes you think of another person, please add them to the list above.

If you have listed all the people this makes you think of, please check the box to continue.



Whom would you turn to if you needed **informational support**, e.g. if you needed guidance, advice or information in order to make decisions?

If this makes you think of another person, please add them to the list above.

If you have listed all the people this makes you think of, please check the box to continue.



Great! You can now continue with the next part of the study by using the submit button.

Submit

Now have a look at Figure 5 to see how to define the name generators and their instructions in the survey spreadsheet. These additional instructions are only supposed to be shown if participants have not already listed 12 people, therefore they all include the condition “counter_SN < 12” in the *showif* column. Row 1 of Figure 5 creates an instruction text, informing participants they will now be told about different situations and instructing them to add every new person these situations make them think of. By typing “check” into the type column of row 2, we create a checkbox called “prompt1”. For the first name generator to show up only after this first checkbox has been checked, we specify “prompt1

== 1” in the *showif* column of row 3. We are setting it as “1” since this equals the value of the item if the box has been checked (in contrast to 0 if it has not been checked). The name generator will show up together with another checkbox item named “prompt2”, as specified in row 4 of Figure 5. Again, this box has to be checked for the second name generator and its respective checkbox named “prompt3” to show up (that is why we put “prompt2 == 1” in the *showif* column of row 5 and 6 of Figure 5), while the third name generator only appears after the checkbox of generator two has been checked (so we put “prompt3 == 1” in the *showif* column of row 8 and 9). Finally, the participants will be shown a final instruction, as specified in row 10 of Figure 5, after the checkbox of name generator three, namely prompt4, has been checked.

Last but not least, the page also includes a submit button, which appears on the bottom of the page, but can only be clicked once all mandatory questions have been answered. The submit button (type: “submit”) is defined in the last row of Figure 5. In formr, multiple choice items are mandatory by default, while check boxes usually are not. Since we wanted our participants to have to go through the name generators before continuing to the next page, we specified for our checkboxes (rows 2, 4, 6 and 8 of Figure 5) that we want these items to be mandatory as well by putting a “!” into the optional column of these items.

Figure 5

Spreadsheet containing the name generators and a submit button

class	type	name	showif	value	label	optional
	note	prompts_ instruction	count_SN < 12		Are you sure you have listed all of the people you would ask for __support__? To make sure you didn't forget anyone, we will now show you a few examples of situations in which you could need support sometimes. (...)	
left600 space_ bottom_30	check	prompt1	count_SN < 12		Please check the box to the right to see the situations.	!

	note	prompt1_text	prompt1 == 1 && count_SN < 12	Whom would you turn to if you needed __emotional support__, (...)	
left600 space_bottom_30	check	prompt2	prompt1 == 1 && count_SN < 12	(...) If you have listed all the people this makes you think of, please check the box to continue.	!
	note	prompt2_text	prompt2 == 1 && count_SN < 12	Whom would you turn to if you needed __instrumental support__, (...)	
left600 space_bottom_30	check	prompt3	prompt2 == 1 && count_SN < 12	(...) If you have listed all the people this makes you think of, please check the box to continue.	!
	note	prompt3_text	prompt3 == 1 && count_SN < 12	Whom would you turn to if you needed __informational support__, (...)	
left600 space_bottom_30	check	prompt4	prompt3 == 1 && count_SN < 12	(...) If you have listed all the people this makes you think of, please check the box to continue.	!
	note	instruction_ submit	prompt4 == 1 && count_SN < 12	Great! You can now continue with the next part of the study by using the submit button.	
left700	submit	submit_1		Submit	

Note. (...) = content of items abbreviated.

Referring back to the people listed in the network. Because you will most likely want to find out more about the network members listed by the participants, we also include a description of how to refer back to the network members in this tutorial.

In our sample study, we wanted to ask participants additional questions about their relationship to the people in their network on a subsequent page. Specifically, we asked them to report how long they knew each member of their network, how much contact they had to each member, and how close they felt to them. The answer options to the last item were taken from the Inclusion of Other in the Self Scale by Aron, Aron, and Smollan (1992). Here, one out of seven images of two circles, which depict the self and the person to which the amount

of felt closeness is to be rated, is to be chosen as a response.⁵ These further questions are specified in the spreadsheet named “networks_template_network_part2”. Have a look at Figure 6 to see an example of what this next page looks like for the participants. To create this figure, we listed a fictional person called Caroline as a 36-year-old female friend on the previous page as part of the support network. Now, the participant is asked for more information about Caroline. As you can see, we did not only want the name of the person to be rated showing up, but also their sex, age and relation to the focal participant. This will be especially helpful for focal participants who only used shortcuts to name the network members and added a lot of people or people with similar names.⁶

⁵To use pictures as response options, just put the picture link in the form of “![description] (link)” into the label column of the choices table for your respective choice list. To upload pictures and retrieve their link, go to your respective run (we will explain more about this later), and upload your files. Afterwards, you can retrieve the link of your file there.

⁶For example, a male 25-year-old friend called “Max”, a female 29-year-old cousin (i.e., other family member) called “Maxi”, and a female 25-year-old acquaintance called “M.”.

Figure 6

Example of user interface of the next study page asking for more information about the people the participants listed on the previous page

Your relationships to the people in your social network

On the subsequent pages we will ask you some more questions about the people you've listed earlier. Please select the options that describe your relationship to each person in question best.

We will first ask you some questions about **Caroline** (female, 36 years old, friend).

For how long have you known Caroline?

How often are you in personal (i.e., face-to-face) contact with Caroline?

How often do you have other contact (e.g., social media, phone) with Caroline?

How close are you to Caroline?

Note. A fictional person called Caroline was listed as an example. The answer options for the closeness question are taken from the Inclusion of Other in the Self Scale (Aron, Aron, & Smollan, 1992).

Figure 7 shows the spreadsheet creating the user interface depicted in Figure 6. To ask the participants further questions about the people listed in their network, we have to refer back to answers given earlier in the study and to items specified in a different spreadsheet. In

general, there are different ways to achieve this. If you wanted to use adaptations only a few times, you could simply put the R code calculating your item of interest's value right into the label column where you want your text to be adapted.⁷ However, as we need to refer to the names and attributes (i.e. age, gender, relationship to focal person) of all people listed, we will instead define new variables that calculate the relevant information for us at the beginning of our spreadsheet, in order to later use these variable names as placeholders in our labels. Furthermore, we will combine this approach with a loop: the same page (as in Figure 6) will be repeatedly shown to participants for each person they have listed as their network members. For this to work, we will define our new variables in a way that the first time the page is accessed the name and information about the first person listed will be calculated, while the second time the page is shown the name and information about the second person listed will be calculated, and so on. For such a loop to work correctly, we need to specify in the study's run that participants are to be sent back to the respective survey page again and again until they have rated each one of the network members they had listed. We will have a closer look at how to achieve this in the section describing how to set up the study's run and first continue with looking at how to define our new variables that calculate each network member's name, age, gender, and relationship to the focal person.

In order to define our new variables, we created 5 items of the type "calculate" (see rows 2 to 6 in Figure 7). In the name column, we define the names we want to use to refer to the calculated variables, while we put the R code used to calculate the variables in the value column. In row 2, we first define the variable "person", where the command

⁷For example, if you wanted to refer to the first person listed, you could get their name printed by simply putting "`r networks_template_network_part1$name_P1`" into your label column. The part after the dollar sign refers to the item you want to get the information out of and the part in front of the dollar sign refers to the spreadsheet the item is specified in, while you need the part "`r`" to specify that this is not plain text, but code which is to be executed in R via rmarkdown. However, this option only works for simple input items (e.g., for items like our name and age questions), or if you specify your written labels directly in your choices worksheet's name column (instead of in its label column; however, in the name column no special characters or spaces are allowed). Otherwise (e.g., for items like our gender and relationship questions), you would need more complex commands to print out the answers given to these items in terms of their written labels (and not the numerical values specified in the name column of your choice's worksheet).

“nrow(networks_template_network_part2)” counts the rows of the result sheet of the survey “networks_template_network_part2” for each participant’s session. Therefore, the item “person” yields 1 when participants see the survey page for the first time, 2 when they see it for the second time, and so on. In row 3, the item “person_name” calculates the names of the network members. As the person variable counts up from 1, the command “networks_template_network_part1[, paste0 (“name_P”, person)]” accesses the information stored in the items “name_P1”, “name_P2”, and so on, in the sheet containing the results each participant gave in response to the items of the networks_template_network_part1 survey sheet. Using the same logic, the respective network members' ages, genders, and relationships to the focal person are calculated in rows 3 to 6.⁸ Having defined these new variables, we can now use them as placeholders in our labels as done in rows 8 to 13. In order for the general instruction only to be shown once and to tailor the further instructions to whether the page is seen for the first time or not, we furthermore put the conditions “person == 1” (which makes items only show up once when the page is accessed for the first time) and “person != 1” (which makes items show up only for the following loops), into the show if column of the items in rows 7 to 9.

Figure 7

Survey spreadsheet for the pages asking for more information about the people listed previously

class	type	name	showif	value	label
	note	instruction_contact_title			### Your relationships to the people in your social network
	calculate	person		nrow(networks_template_network_part2) (...)	
	calculate	person_name		networks_template_network_part1[, paste0	

⁸Please note that for our gender and relationship items, which are not simple input items, but items with predefined choice lists, the function “calculate” automatically transforms the answers, which are stored in the result sheet in terms of the values specified in the choices sheet’s name column, into the respective labels specified in the choices sheet’s label column.

				("name_P", person)]	
	calculate	person_sex		networks_template_network_part1[, paste0("sex_P", person)]	
	calculate	person_age		networks_template_network_part1[, paste0("age_P", person)]	
	calculate	person_relation		networks_template_network_part1[, paste0("relation_P", person)]	
	note	general_instruction_contact	person == 1		On the subsequent pages we will ask you some more questions about the people you've listed earlier. (...)
left500	note	instruction_contact_1	person == 1		We will first ask you some questions about __`r person_name`__ (...) ⁹
left500	note	instruction_contact_2	person != 1		We will now ask you some questions about __`r person_name`__ (...)
left500	select_one choice_list_2	known_how_long			For how long have you known `r person_name`?
left500	select_one choice_list_3	contact_personal			How often are you in personal (i.e., face-to-face) contact with `r person_name`?
left500	select_one choice_list_3	contact_media			How often do you have other contact (e.g., social media, phone) with `r person_name`?
left500 (...)	mc_button choice_list_4	closeness			How close are you to `r person_name`?
left700	submit	submit			Submit

Note. (...) = content abbreviated.

Step 3: Survey upload. To upload your survey spreadsheet(s), you need to log into formr with your administrator account and choose “Create new Survey” on the formr admin

⁹Please note that only the part of the label leading to the display of the listed person’s name is printed here. To view the whole label, please see the corresponding spreadsheet on the OSF.

page. Here, you can upload item tables as local Excel files, OpenDocument spreadsheets, and comma- or tab-separated value files, or import them in the form of a Google Sheet.¹⁰ Besides allowing easy sharing of the item table for collaboration with others, Google Sheets will give you the advantage of allowing the synchronization of changes in the sheet with formr in one click, which simplifies debugging. When uploading an item table, the file name will be used as the survey name, while you can choose a name when importing a Google Sheet. Make sure to use meaningful survey names, because once the study has started, it would become difficult to change survey names given and they will be used to refer to the survey's results in different places.

To recreate our study template, you need to upload our sample spreadsheets. In total, these are five sheets. So far we have looked in detail at the two sheets assessing the social network and the relationships to the people in it. Furthermore, the template includes one spreadsheet with demographic questions and two sheets assessing the personality of the focal person and the personalities of the people in the network, respectively.

By uploading these sheets, you are creating five new surveys named after the spreadsheets' file names. If you have uploaded our sample spreadsheets to Google Sheets, please be sure to name them after their original file names.¹¹ After creating your surveys, you can navigate to their respective survey pages by clicking on the "Surveys" tab in the upper left corner of the admin pages. Among other things, on the survey pages, you can update your items by reuploading the item tables or resynchronizing the Google Sheets after making changes. In addition, you can use the preview to see what the survey will look like to your participants.

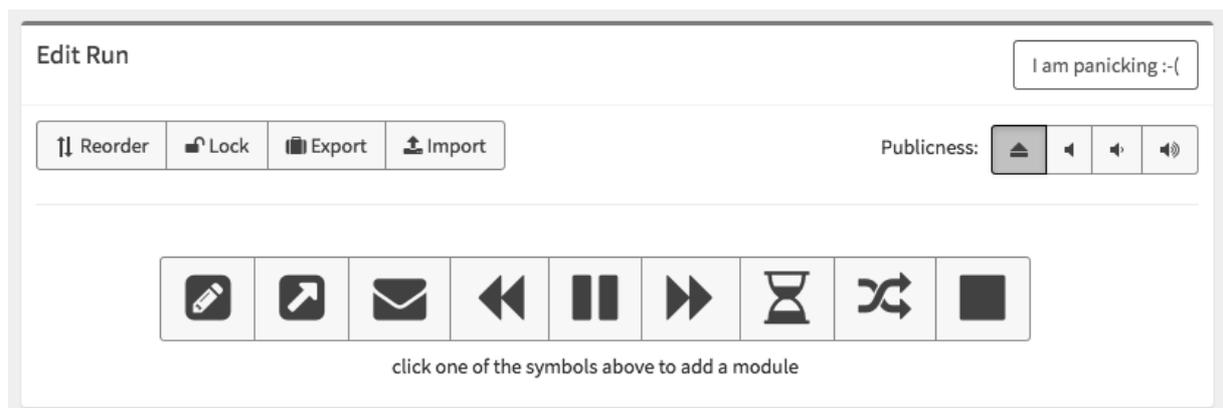
¹⁰For the last option (using a Google Sheet) to work, you need to make sure your sheet is accessible for anyone with a link. To achieve this, you have to click on the "Share" button in the upper right corner of your Google Sheet and in the new window that pops up choose "Anyone with the link can view". Now you can use this link to upload the Google Sheet.

¹¹As explained earlier, these names are used to create the adapted questions and the personalized feedback. Therefore, these features will no longer work if you change the file names without changing the code accordingly.

Step 4: Setting up the study—the formr run. After uploading the spreadsheets that are going to make up your study, you need to bind these different elements together using the study control framework. This is done by creating a new run. To do so, select “Create Run” on the admin page and enter a meaningful name for your run.¹² The formr study control framework is built up as a simple programming environment, where you define the chronological order of your *run modules* (e.g., your different surveys) by using if conditions and GOTO statements. Have a look at Figure 8 to see what the study control framework page looks like (when no modules have been added yet).

Figure 8

Screenshot of an empty run page, showing the tape deck toolbar on the bottom of the page, as well as publicness and other settings on the top of the page



As you can see, there is a toolbar depicted at the bottom of this page. The six rightmost symbols of this toolbar resemble a tape deck's controls and represent the following modules allowing you to control the chronology of your study: Skip Backward (Loop), Pause, Skip Forward (Jump), Waiting Time, Shuffle, and Stop. The Stop module is used to create a study's endpage, while you can make participants wait for a certain time by adding a Pause module or send out reminders by using the Waiting Time module. You can send your participants to different parts of your study by defining if statements for Skip Forward and Skip Backward modules, for example, if specific parts of your study should only be shown to

¹²Please note that you would also have to create a run if your study consisted of only one survey spreadsheet - a minimal version of a run consists of a single survey and an end page in the form of a stop button.

people fulfilling certain criteria. Using the Shuffle module, you can randomly assign participants to different groups. The leftmost symbols in the toolbar allow you to add your different surveys as modules to the run (pencil symbol), or to send emails (letter symbol) and make external calls (e.g., sending text messages, arrow symbol).

To build up our template study's run, we will need to create five separate Survey modules for each of our different survey pages, two Skip Backwards modules to loop the survey pages asking for in-depth information about the relation to the network members and their personality¹³, as well as a Stop module for our endpage. As you add new modules to your run, they will be positioned in the order they were added and given the numbers 10, 20, 30, and so forth. To change the position of a module after adding it to your run, change these numbers accordingly and save the new order by clicking "Reorder" in the upper left corner of the page (see Figure 8).

Have a look at Figure 9 to see an example of what the run modules for our sample study look like (with modules 10, 20, 30 and 80 not being depicted). To build up our run, we start by just adding the survey sheets as new modules to our run (simplest in their chronological order, i.e. "networks_template_demography", "networks_template_personality_self", "networks_template_network_part1", "networks_template_network_part2", and "networks_template_personality_others") by clicking on the pencil symbol and each time choosing the respective survey from the drop-down list. As mentioned before, Skip Backwards modules (loops) are used to send participants back to certain positions in the run if certain conditions are met. In our sample study, we use such a loop to send our participants back to the survey page asking for additional information about the network members ("networks_template_network_part2") as long as they have not yet provided more information about all of the people they had listed.

¹³Please note that the survey pages asking for personality ratings about the network members, which we did not further discuss in this tutorial, works over the same looping mechanism as explained on pages 19 to 21 for the retrieval of further information about the network members.

This is the case as long as the number of rows in the respective results sheet is lesser than the amount of people the participant has listed. Therefore, we create a new Skip Backwards module by clicking on its symbol in the toolbar and we put

```
“nrow(networks_template_network_part2) < networks_template_network_part1$count_SN”
```

into the Skip Backward modules input field labeled “if...” (see module 50 in Figure 9).

Furthermore, we have to specify that in this case participants are to be sent back to the respective sheet (“networks_template_network_part2”). As this sheet is contained in our survey module 40, we put “40” in the Skip Backward modules input field labeled “...skip backward to” (again, see module 50 in Figure 9). Using the same logic, we add another Skip Backwards module to create a loop that sends participants back to the survey page asking about the network members’ personalities, until all network members have been rated (see modules 60 and 70 in Figure 9). If you add these two Skip Backwards modules after adding the survey modules, please note that you will have to manually reorder them as explained above for them to be correctly positioned in the run. To create a new endpage in the form of a Stop module (which is a required feature of every run to end), you need to click on the square symbol in the tape deck toolbar. On the endpage, you could for example enter a debriefing for the participants who finished the study, or, as in our sample study, create personalized feedback on the basis of data provided by the participants. We will explain how to include feedback on the endpage of the study in the next section.

Figure 9

Screenshots of a subset of the run modules of the sample study



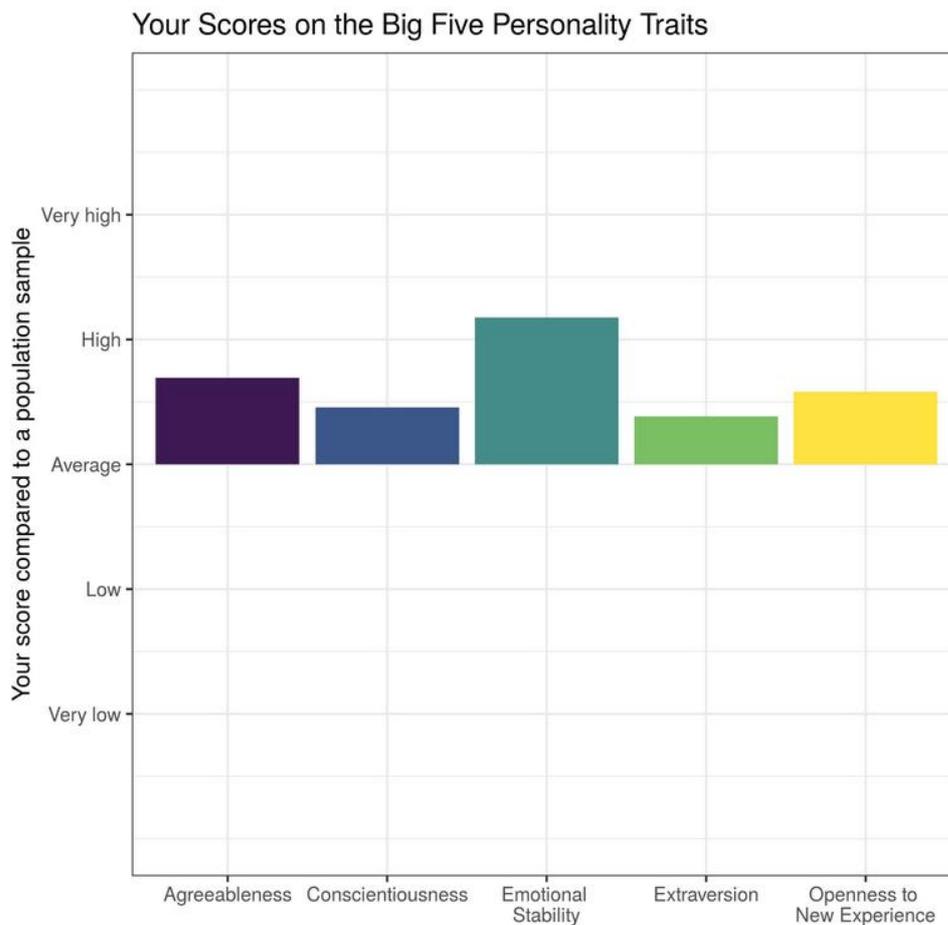
As mentioned earlier, formr allows for easy sharing of reproducible study materials. This can, for example, be done by exporting runs as JSON files. These files include the whole structure of the run (and, if desired, also the survey spreadsheets) and can be used to share designs (and spreadsheets) with collaborators or other researchers interested in replicating your design. You can find the JSON files corresponding to our template study in the “Run Settings” folder of this project on the OSF (<https://osf.io/sgkwz/>). If you do not want to set up the run manually as described above, you can instead select “Import run” after creating a new run and, after downloading the JSON file from the OSF website, upload it here. Please note that you will find two JSON files in the OSF folder: one including only the structure and settings of the run, and another one additionally including the spreadsheets. If you import the former one, you will still have to add the survey spreadsheets manually to the modules; if you import the latter one, you will directly end up with a fully functional setup of the study.

Optional Step: Including feedback on the endpage of the study. As mentioned earlier, our template study included a page on which participants were asked to rate their own personalities. For this purpose, we used the items of the Ten Item Personality Inventory

(TIPI; Gosling, Rentfrow, & Swann, 2003)¹⁴. Among other things, this allowed us to provide participants with a feedback of their personality in terms of the Big Five personality traits, in comparison to the distribution of values in a reference sample. Have a look at Figure 10 to see what the feedback looked like to the participants.

Figure 10

Big Five Personality feedback as shown to participants on the study's endpage



Note. Descriptions of the personality traits (not depicted here) were included to guide interpretation of the graph.

¹⁴These items were presented to our participants in a random order. If you want to randomize one block of items, you need to add a new column called *item_order* to your survey sheet and specify the order you want your items to be shown in, where items that are assigned the same number will be randomized. For example, if you wanted your instruction to be shown first, your submit button to be shown last and all items in between to be randomized, you would assign a 1 to the instruction and a 3 to the submit button, while you would assign a 2 to all items in between. If you wanted to randomize different blocks of items, you would need to add another column labeled *block_order*, to specify the different blocks. Have a look at our sample spreadsheets “networks_template_personality_self” and “networks_template_personality_others” to see how randomization can be accomplished.

To create feedback appearing on the endpage of our study, we have to execute R code in the feedback text field of our endpage module on the study control framework page. Figure 11 shows the code used to create the personality feedback graph. As you can see, the code is preceded and followed by “`````”, which indicates that we are now writing a new *chunk* of R code, instead of just writing plain text. In the first line of the first paragraph, we are setting the size of the plots that are going to be created in this chunk. In lines 2 to 5, we are loading the packages which we require to transform the data into an adequate format for plotting (`tidyr`, `dplyr`) and to create a graphical representation of the feedback (`ggplot2`, `ggrepel`). In line 6 and 7, we use the command “`formr_post_process_results()`” to retrieve the data entered in response to our survey spreadsheet called “`networks_template_personality_self`” and create a new dataframe out of these results. The command leads R to automatically identify which items belong to the same scales of our measure and aggregate them into mean scale scores. In order for this to work, there are certain conventions you need to follow while naming your items. Each item name should consist of the scale name and the position of the item on the scale, with an “R” at the end for reversed items. For example, the two items belonging to the extraversion scale of the TIPI were named “`tipi_self_extra1`” and “`tipi_self_extra2R`” in our spreadsheet.

Since R automatically identified and aggregated the scales for us, we can now continue with transforming these mean scale values according to means and distributions from a reference sample and binding them to our dataframe as new variables, as depicted in lines 9 to 18 in Figure 11. In our example, the reference data was taken from Gosling et al. (2003). After doing so, we create a new long format data frame called “`big5`”, containing only the normed values of our five personality domains (with one row per domain), which we need to plot the data using `ggplot2`. This is done in lines 20 and 21 of Figure 11. Finally, in lines 23 to 34 in Figure 11, we are using `ggplot2` to create a graphical representation of the normed values.

Figure 11

Code used to create personality feedback on the study's endpage

```

1  `` {r motiv.opt,fig.height=9,fig.width=9}
2  library(tidyr)
3  library(dplyr)
4  library(ggplot2)
5  library(ggrepel)
6  networks_template_personality_self = formr_post_process_results
7  (results=networks_template_personality_self, item_list = NULL, fallback_max = 7)
8
9  networks_template_personality_self$extraversion =
10 (networks_template_personality_self$tipi_self_extra - 4.44) / 1.45
11 networks_template_personality_self$openness =
12 (networks_template_personality_self$tipi_self_open - 5.38 ) / 1.07
13 networks_template_personality_self$conscientiousness =
14 (networks_template_personality_self$tipi_self_consc - 5.40 ) / 1.32
15 networks_template_personality_self$agreeableness =
16 (networks_template_personality_self$tipi_self_agree - 5.23 ) / 1.11
17 networks_template_personality_self$emotionalstability =
18 (networks_template_personality_self$tipi_self_emostab - 4.83 ) / 1.42
19
20 big5 <- networks_template_personality_self %>% select(extraversion, openness,
21 conscientiousness, agreeableness, emotionalstability) %>% gather(variable, value)
22
23 ggplot(big5,aes(x=variable,y=value, fill = variable))+
24 geom_bar(stat="identity",position=position_dodge())+
25 ylab('Your Score')+
26 labs(title="Your Scores on the Big Five Personality Traits")+
27 scale_fill_brewer("",palette="Set1", breaks = c("extraversion", "openness", "conscientiousness",
28 "agreeableness", "emotionalstability"), labels = c("Extraversion", "Openness to \nNew
29 Experience", "Conscientiousness", "Agreeableness", "Emotional \nStability"))+
30 scale_y_continuous(limits=c(-3,3),breaks=c(-2,-1,0,1,2),labels=c('Very
31 low','Low','Average','High','Very high')) +
32 scale_x_discrete("", breaks = c("extraversion", "openness", "conscientiousness", "agreeableness",
33 "emotionalstability"), labels = c("Extraversion", "Openness to \nNew Experience",
34 "Conscientiousness", "Agreeableness", "Emotional \nStability"))
35 ``

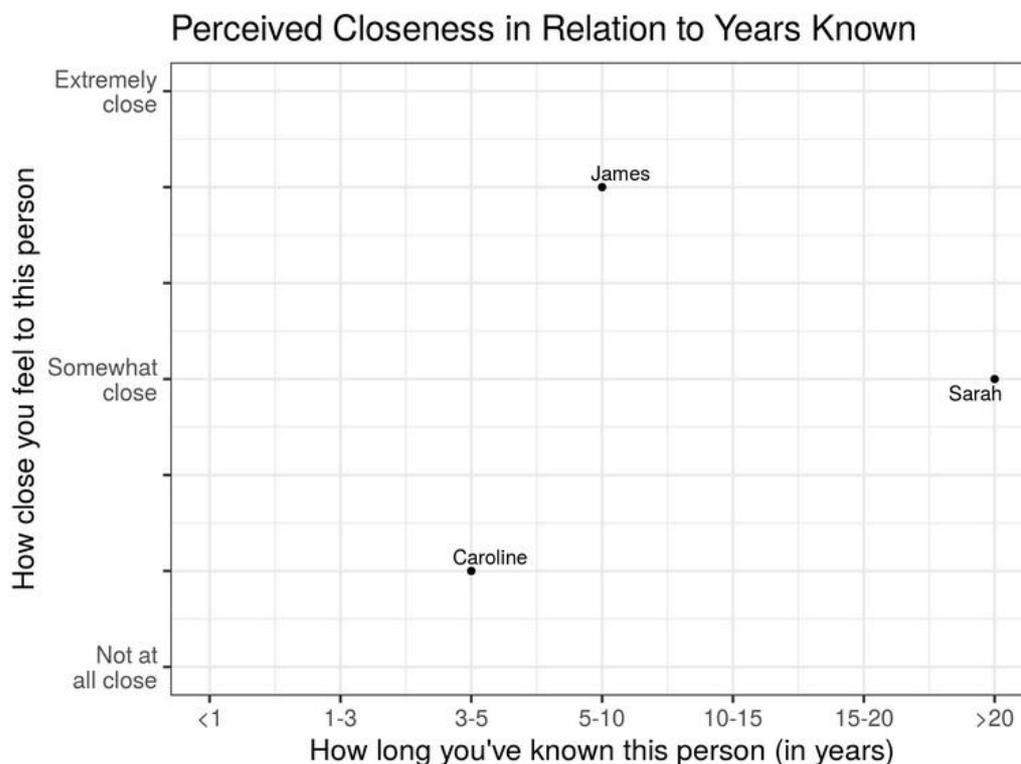
```

We also added some text around the plot that explains the meaning of the plot to participants on the survey endpage. This was added as plain text into the feedback text field of the endpage module on the run page.

In addition to this first feedback plot, participants also received graphical feedback about how the time they have known their network members is related to how close they feel to them, and about how they perceive their own personality compared to how they perceive the personalities of their network members. Figure 12 and 13 show what these feedback plots looked like to participants. Please consult the study's run settings (as specified in its respective JSON file, which can be found in the "Run Settings" folder of this project on the OSF (<https://osf.io/sgkwz/>)) to see the code used to create these additional feedback graphics, including some explanatory comments.

Figure 12

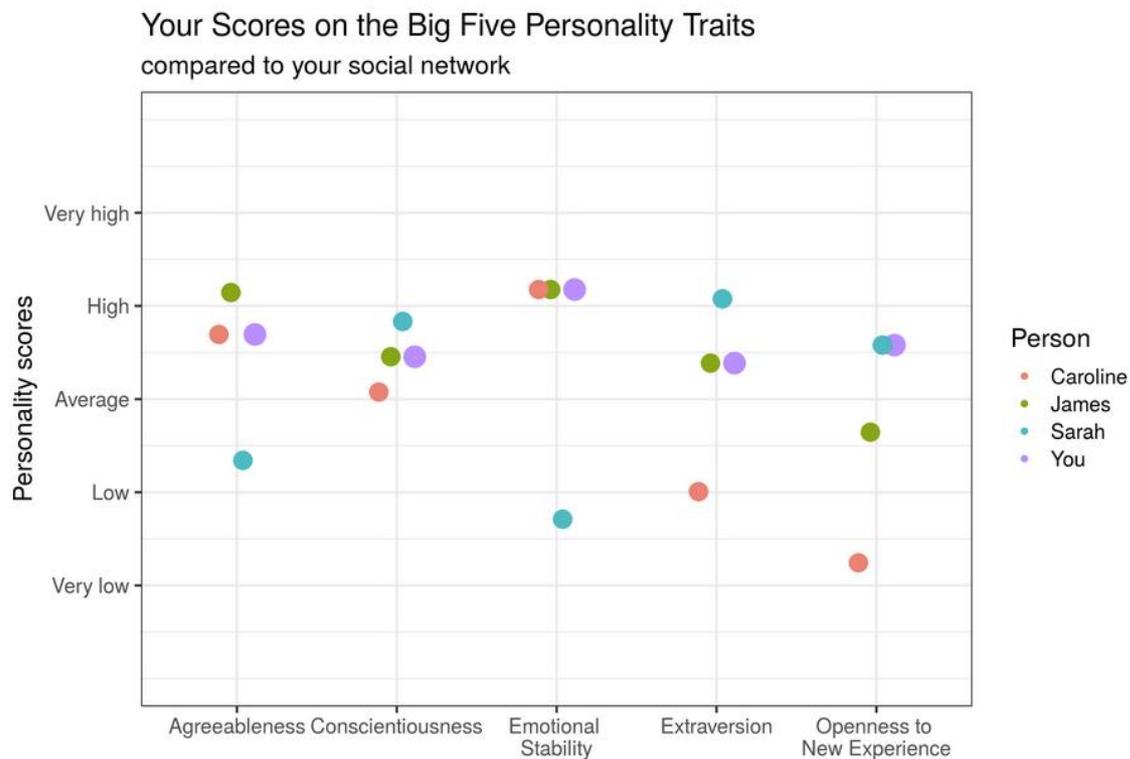
Feedback about the relationship between perceived closeness to the network members and the years each network member is known, as shown to participants on the study's endpage



Note. Fictional data was added for three network members.

Figure 13

Feedback about how the personalities of the network members are perceived in relation to how the focal participant perceives their own personality



Note. Fictional data was added for three network members.

Step 5: Testing the study. Testing and meticulous debugging are important steps when implementing a study, in particular if your study includes a more complex design such as assignment to conditions, questions that are adapted to previous answers, or personalized feedback. In formr, there are different ways of testing your study. You can test single surveys or a whole run by yourself by clicking “Test Survey” or “Test Run” in the respective “Testing & Management” tab of the survey and run pages. You can also create test links to let other people test your study or use the test links yourself. To do so, under the same tab, go to “Users” and click on “new test users”, which will make a new browser window pop up. Copy the link in the new window to retrieve the test link. If you or others test your study this way, a little bar, the so-called *monkey bar*, will appear on the bottom right corner of the page. Using this *monkey mode* allows you to test the study without filling out every single item by hand - the formr monkey is always at your service and will do it for you! The bar also allows to

show hidden items and debugging messages, to skip pauses and navigate between the different surveys and other modules, as well as to delete the test data for a previous module or the whole test user. When the testing mode is on, any errors in the R code will lead to the code and accompanying debugging messages to be shown on the pages.¹⁵ If you choose to create “real users” on the “Users” page, you can create named users, for whom there will be no monkey bar nor any debugging messages shown when taking the survey.

If you want your study to be tested by other people, you need to remember to make it accessible for others. As depicted in Figure 8, the publicness settings of your study can also be found on the run page. You can choose between four options: you can make the study visible only to yourself, to people with an access code, to people with the study link, or to everyone (by selecting this last option, the study will show up publicly on <https://formr.org/studies>, too). For others to be able to test your study, you will need to at least set it to public for everyone with an access code, which is also the option we recommend for testing.

Step 6: Running the study. After testing your study and making sure everything is working out as intended, you can finally run your study by choosing your desired publicness option (in case it is different from the option you used for testing).

You can see how many people participated in your study so far by looking at the “Users” page already mentioned above. Here, you can also see each user's progress in the run, send them to different positions within the run, or delete their sessions. If you do not delete all the data after testing your study, you will find both test users and real users listed here. You can nevertheless easily identify test sessions by an “XXX” and animal names in their code¹⁶ (unless you created new “real users” for testing and gave them different names).

¹⁵Please note that when accessing our sample study through the testing mode, you will also be shown some R warning messages. These warning messages serve to detect and debug errors in the code; in our case, however, they are no reason for concern.

¹⁶This will come in handy later when cleaning your data in R. For example, you could simply use the command “`dplyr::filter(dataframe, !grepl('XXX', session)) -> new_dataframe`” to get rid of the data from test sessions. This command creates a new data frame containing only the data sets of your real users, as only rows without an

The results of your study are stored separately for every survey. To look at the data, go to each survey page and select “Show Results” in the “Testing & Management” section. Here, you will find the results in wide format, where each row contains the data of one participant and the columns refer to the different items in your survey (with a few additional columns including information about the survey participation, e.g., the session ID [session], when the survey was started [created], and finished [ended]).¹⁷ To download the results, select “Export Results” in the “Testing & Management” section and choose your desired file format.

Optional Extension: Incorporating the Graphical Ego-centered Network Survey Interface (GENSI; Stark & Krosnick, 2017) in formr

A strength of formr is that it permits extensive customisation, including dynamic client-side programming using Javascript. This makes it possible to use other existing software as modules in formr. For example, the Graphical Ego-centered Network Survey Interface (GENSI; Stark & Krosnick, 2017) can be used to elicit the names and relationships of social network members. GENSI is a Javascript-based module which allows participants to add their social network members in a graph. While GENSI can also be used to record demographic information and ratings, it especially excels at collecting network variables, such as recording who knows whom in a network, which can be recorded by drawing connections between nodes in the social network. Network information recorded using GENSI can then be used in the subsequent formr-based study to generate further questions and feedback. Figure 14 shows an example of what incorporating GENSI in formr can look like. Here, the names of the network members, their gender, as well as connections between the different network members can be added into a graphical network representation. By

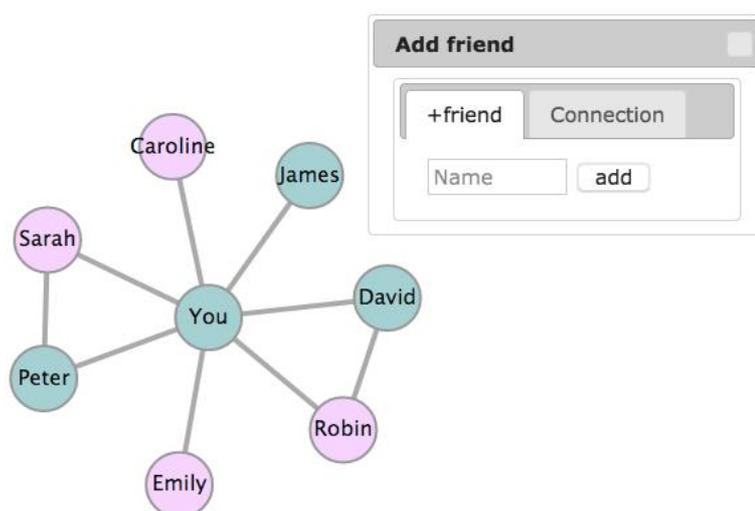
“XXX” in the session column (where the user codes are stored) are included. Alternatively, if you decide to use the accompanying R package for formr, the command “formr_results” will even remove the test cases for you automatically.

¹⁷ You can also find the results in long format by selecting “Detailed Results” in the upper right corner of the page. Choosing this option, every item response has its own row, which can be useful for later analyses in R. For example, to conduct linear analyses or to plot your data using certain packages (e.g., ggplot) your data will have to be in long format.

selecting the tab “+friend”, the network members’ names can be added as nodes to the network and by clicking on the respective nodes, each network member’s gender can be indicated (the color of the node will change from green to pink, with green indicating a male network member and pink indicating a female network member).¹⁸ When selecting the tab “Connection”, connections between the different network members can be drawn by clicking on their respective nodes. If you continue to the next page afterwards, you will be shown how all of this graphically retrieved information will be stored in formr. The code to create this example’s respective run is provided as a JSON file and can be found in the “GENSI Incorporation” folder of this project on the OSF (<https://osf.io/sgkwz/>).

Figure 14

Screenshot of sample implementation of GENSI in formr



Note. Information about seven fictional network members was listed.

Summary

In this tutorial, we demonstrated how to assess egocentered social networks online using the open-source software formr (Arslan et al., 2019). When adequately utilized, assessing social networks can prove to be a valuable tool for the investigation of research questions relating to various fields of psychology and relationship science in particular. The

¹⁸Please note that different colors could be assigned to represent male and female network members and that further options could be added to include a more exhaustive range of genders.

online assessment of social networks allows researchers to reach out to large and diverse populations, to collect data fast and cost-effectively, and—an advantage of particular importance for the assessment of egocentered social networks—to automatically adapt instructions or questions to participant's earlier responses (Kraut et al., 2004). However, online assessments of social networks might be hard for researchers to implement.

Therefore, in this tutorial, we provided detailed instructions on how to set up, test and finally run a study assessing egocentered social networks using the open-source software formr. Advantages of using formr are its open accessibility, that is allows for an easy sharing of reproducible study setups, and that it readily entails all functions needed to assess basic as well as more sophisticated egocentered social networks. To guide readers through our tutorial, we provided a template for a fully functional study assessing a basic egocentered support network, which can easily be adapted for other research purposes; for the more advanced readers, we also discussed valuable extensions to the template's design, such as the inclusion of personalized feedback and the incorporation of an existing Javascript based graphical social network assessment tool.

While our template assesses concurrent networks in the context of a cross-sectional study, a number of interesting extensions to this design can be implemented using formr in its current version. The extensions include investigations into how the composition of networks changes over time, moving beyond self-reports of the focal person by recruiting network members into an extended social networks study, or using the generation of different networks as the core manipulation in experimental studies. To sum up, the online assessment of egocentered social networks opens up a number of interesting avenues for future research. By providing this tutorial, building on the open-source framework formr, we hope to democratize the ability of researchers from different backgrounds to collect social network data and encourage scholars to make use of this fascinating design in their own research.

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