

From Serial Reproduction to Serial Communication: Transmission of the Focus of Comparison in Lay Communication about Gender Inequality

We introduce and explore the potential of the *serial communication method*, a modification of the serial reproduction paradigm in which participants communicate their own thoughts. It affords participants more agency, more closely simulating real communication. We specifically examined the transmission of the focus of comparison in explanations of gender inequality, a consequential form of equivalency framing. Participants in Wave 1 ($n = 86$) read about women being underrepresented (focus on women) or men being overrepresented in leadership (focus on men), then explained this difference. Participants in Wave 2 ($n = 208$) and Wave 3 ($n = 199$) then read randomly selected explanations from the preceding wave before giving their own explanations. The initial focus affected subsequent communication and was partially transmitted to Wave 2, but not Wave 3. We discuss implications and the value of the method for research on the framing of inequality, cultural transmission, and competing frames.

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There are more men than women in leadership. There are fewer women than men in leadership. Logically speaking, these two statements describe the same fact, however, they are *framed* differently. The reasons for such different, yet logically equivalent, framings and their effects on people's thoughts, feelings, and actions have long been of interest to communication researchers, psychologists, and political scientists. Previous research has mainly used two methods to study such framings: analyses of real-life communication (e.g., in social media) and experimental studies. Analyses of real communication are usually descriptive or correlational in nature and allow researchers to examine, for example, the use of different framings by different stakeholders or in different contexts (e.g., Groshek & Al-Rawi, 2013; Nisar & Prabhakar, 2018; Siapera et al., 2018). In experimental studies, participants usually read information that is framed in one of multiple different, but often logically equivalent, ways and then indicate their thoughts, emotions, or behavioral intentions in response to this information (see Amsalem & Zoizner, 2022 for a meta-analysis). The main advantage of experimental studies is that they can uncover causal effects of different framings. However, they usually only examine immediate reactions to one single instance of framing, often by elites such as politicians, researchers, or the media, and are thus relatively far removed from communication processes in real life.

Accordingly, even though these two methods have contributed in undisputable ways to our understanding of framing and framing effects, in isolation, they do not allow us to answer several important questions about framing effects in real communication. For example, does framing affect subsequent communication? More specifically, does the framing of a statement causally affect how people frame their own contributions to subsequent communication – and thereby perpetuate, change, or eradicate initial framing effects? How long does the influence

of an initial framing last? In the present research, we examine whether and to what extent different, logically equivalent framings of gender inequality affect the framing of subsequent communication about this issue, specifically, explanations of gender inequality. However, to investigate this, we had to develop a new method – a method that combines experimental control with the observation of communication patterns and can therefore answer questions about causal influences of different initial framings on subsequent communication: the *serial communication method*. We outline this method below. But first, we explain our specific research question on the framing of gender inequality.

Framing and the Focus of Comparison

Framing research is a vast field that uses various definitions of framing. An important distinction is between *emphasis* and *equivalency frames* (Scheufele & Iyengar, 2017). We will focus on the latter, that is, on framings that do not change the content or logical meaning of what is said, but can still affect receivers' cognitive, affective, and behavioral reactions to it. In particular, we will look into a type of framing that (a) is almost omnipresent in communication about differences between social groups and (b) has important consequences for how people construct and respond to inequality: the *focus of comparison*.

In most instances, a comparison entails comparing one entity (the subject of comparison) with another (the referent). Which entity is the subject and which the referent is called the focus of comparison. The focus of comparison thus refers to logically equivalent statements, such as “women earn less than men” and “men earn more than women”. Previous research shows that the focus of comparison can affect cognitive processes of receivers. People generally focus their attention on the subject of comparison, whereas the referent becomes part of the less visible background (Chambers & Windschitl, 2004). Consequently, the distinctive features of the subject guide the processing of a comparison more than the features of the referent (Tversky, 1977; Wänke & Reutner, 2011). For the context of gender

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inequality, this means that the sentence “There are fewer women than men in leadership positions” makes aspects that distinguish women in leadership positions from men more salient. In contrast, the sentence “there are more men than women in leadership positions” makes aspects salient that distinguish men from women.

The focus of comparison is an essential part of communication about social inequalities, where comparisons are necessary to communicate differences between groups. Studies show that in this context it not only affects cognitive processes but also a range of other variables, for example, intergroup emotions such as guilt and sympathy, attitudes toward the compared groups, legitimacy appraisals for social inequalities, and even support for interventions to reduce inequality (Bruckmüller et al., 2017; Dietze & Craig, 2021; Harth et al., 2008; Lowery et al., 2009; Powell et al., 2005). In sum, the focus of comparison is an important kind of equivalency framing that has been shown to affect a range of variables in contexts of social inequality – at least in experimental studies in which the immediate reactions of people exposed to different framings used by elites such as researchers, the media, or politicians were assessed. Another important actor in social discourse that has been widely ignored in this research are regular people communicating with each other.

Framing in Lay Communication

How laypeople talk about an issue is an important aspect of public discourse (Druckman et al., 2018; Neubaum & Krämer, 2017), and its relevance has grown since the rise of social media has blurred the line between who is the audience and who is the source of information (Flanagin, 2017; Zhou & Moy, 2007). Framing research should therefore take into account that each person can choose what and how they communicate and that they also have agency within their community (Basu & Dutta, 2009; Druckman & Nelson, 2003).

With that in mind, one critique of experimental framing research, namely, that single instances of one particular framing do not accurately depict real communication, becomes

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even more pressing. In real communication, people may encounter a mix of different framings in other people's utterances, both in terms of their wording (i.e., equivalency framing) and in terms of what aspects of an issue people talk about (i.e., emphasis framing) (Sniderman & Theriault, 2004). When people subsequently express their own thoughts and opinions, they may not stick to one single framing either. Previous studies on the effects of equivalency framing have rarely taken the complexity of multiple, potentially competing frames into account, and to the best of our knowledge, none of the research on framing inequality has.

Yet, research on competing frames indicates that considering this complexity is important, even though most of this research has investigated emphasis, not equivalency framing. A recent meta-analysis shows that encountering competing emphasis frames in elite communication can reduce the effect size of an initial framing (Amsalem & Zoizner, 2022). However, in one experiment on lay communication, the exposure of only one person to partisan media reporting (a form of emphasis framing) affected the political attitudes of an entire group after they discussed the issue (Druckman et al., 2018). This shows that effects of emphasis framing can also persist and spread in competitive frame environments. Interestingly, much less research concerns competing equivalency frames in lay communication. In fact, we are only aware of one study. Druckman (2004) found that discussions between participants reduced, but did not eliminate, the effects of different, experimentally induced equivalency frames, presumably because competing frames were introduced in these subsequent discussions. Importantly, while the initial framing that participants in this study read prior to the discussions was experimentally controlled, what frames participants used and encountered in the subsequent discussion remains unknown.

Our study aimed to analyze how an initial framing, in particular, the focus of comparison, affects subsequent communication among laypeople in the context of gender inequality. Similar to previous studies, we experimentally varied which framing of inequality

two initial groups of participants were exposed to. However, unlike previous studies, we also assessed how they and participants in subsequent communication chains framed explanations of inequality themselves. We specifically investigated whether and how long a focus on men, a focus on women, or a mix of both was transmitted as communication continued after an initial framing manipulation. The method we developed to do so builds on an established method that is commonly used to investigate the transmission of content in communication, the *serial reproduction paradigm*. Below, we briefly describe this paradigm and how it is usually implemented. We then outline why we needed to adapt it for our research question and how we did so to study serial communication rather than serial reproduction.

The Serial Reproduction Paradigm

The serial reproduction paradigm (Bartlett, 1920; Kashima & Yeung, 2010) examines what (mis-)information people recall and pass on from texts and conversations (Coronel et al., 2020; Stafford et al., 1989). The method is akin to the children's game "telephone", where information is passed on from one person to the next through communication chains. The task for participants in serial reproduction studies is to reproduce information. In the first of usually three waves, a person is presented with information and then asked to reproduce it. In the second wave, their reproduction is then presented to the next person who again is asked to reproduce it and so on (Kashima & Yeung, 2010). This method has contributed valuable knowledge to the understanding of shared realities in communication sciences and psychology (Kashima, 2014). For example, studies found that participants are more likely to pass on aspects that fit with their personal expectations or stereotypes (Allport & Postman, 1947; Bangerter, 2000; Bartlett, 1920; Lyons & Kashima, 2003).

To date, the main focus of serial reproduction studies has been on the *content* of what is passed on from one person to the next, not on framing. We are aware of only two studies. Connor and colleagues (2016) examined the transmission of specific combinations of framing

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and content in messages about climate change. Although the less common gain frames (what can be gained from action against climate change) were transmitted more initially, the more common loss frames (what can be lost) survived longer through the communication chains. Coronel and others (2020) combined the serial reproduction paradigm with other measures to investigate memory effects of competing emphasis – not equivalency – frames. They found that in the retelling of competing frames from person to person, some frames were lost, reducing the number of competing frames in the process.

The Serial Communication Method

Building on this extensive previous research our goal was to study the transmission of equivalency framings in communication. Importantly, our focus was not on the transmission of information, that is, on *what* people reproduce, but rather on *how* they express their own thoughts and opinions as they communicate about an issue. Accordingly, our methodology differs from serial reproduction studies in two important ways: First, participants in the first wave read information framed in a particular way and are then asked to state their own thoughts on the respective issue. That is, unlike in the serial reproduction paradigm, they are not asked to reproduce specific content, but to give their opinion on an issue. They thus have more agency over what and how they communicate, more closely simulating real-world communication where people normally do not simply reproduce a piece of information, but rather enrich it with their own thoughts and style and where they are often confronted with competing frames.

As a second difference to most previous serial reproduction research, and following the call for further experimental paradigms to simulate different social network structures in communication (Kashima et al., 2018), in our study, each participant in the second and third wave of the communication chains was confronted with frames and opinions from several other participants. This simulates social discourse more closely than classic one-on-one

communication chains, as in real life, many people communicate their thoughts in conversations with multiple people or publicly on (social) media. Importantly, in the current study, the same focus of comparison may be used to communicate different opinions and different foci may be used to communicate similar opinions, as the logically equivalent focus of comparison is independent of the specific content. Using a simulation of communication networks, therefore, allows us to investigate the transmission of the focus of comparison while decoupling it from the specific content of any one particular statement – as participants see multiple statements that are randomly drawn from the previous wave. As outlined above, the focus of comparison is important in its own right, independent of content, because it has been shown to affect perceptions and reactions to social inequality (Bruckmüller et al., 2017; Dietze & Craig, 2021; Harth et al., 2008; Lowery et al., 2009), including gender stereotypes and the legitimacy of status differences between women and men (Bruckmüller et al., 2012).

Present Research and Hypotheses

We used the serial communication method to study how the focus of comparison in communication about gender inequality in top leadership positions affects subsequent communication about this issue, specifically, whether and to what extent the focus on women and the focus on men are passed on in communication.

In the present research, communication chains started with data from a previous study in which participants read a description of gender inequality focused either on women or on men and then gave their own explanations for this inequality (Bruckmüller & Braun, 2020). These explanations served as Wave 1 in the present study. We simulated real-life discourse by exposing participants in two subsequent waves to six different explanations randomly drawn from the same condition in the preceding wave, and by then asking participants to give their own explanation. Therefore, we have two conditions, one in which communication chains started with people who had read a description of gender inequality with a focus on women,

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and one in which they started with a description focused on men.

One key question of the present study is whether the focus of comparison in the initial description will affect the focus of comparison in participants' explanations in the subsequent communication chains. We know from previous research that the subject of comparison is more salient for further processing (see Chambers & Windschitl, 2004). Accordingly, reading about the unequal representation of women and men in leadership with a focus on one gender group should cause participants in Wave 1 to think more about this group when searching for an explanation for the unequal representation, and to thus frame their explanations with a focus on the same group. When participants in Wave 2 then read these explanations that more often focus on the respective gender group, this would again make this group more salient, leading to more explanations focused on this group, and so on. Such a transmission of framing could also explain the results of Druckman and colleagues (2018), who found that group discussion after an initial exposure to a certain framing affected people who participated in the discussion but who themselves had never been exposed to the initial framing.

Accordingly, we expected the initial focus to be transmitted through the communication chains and to affect the relative use of focus in participants' own explanations ("explanation focus" in the following), at least to some extent. This expectation contains two related, but separate predictions. The first concerns group-level differences in explanation focus between communication chains that start with a different focus of comparison in the initial description (across the three waves). The second concerns the extent to which each explanation focus is passed on within the chains from one wave to the next.

First, with regard to the differences between communication chains, we expected an effect of the initial focus of comparison on participants' explanation focus in subsequent communication, such that an explanation focus on a particular gender group would be higher

in chains that started with an initial focus on that group.

Hypothesis 1 (H1): Communication chains with an initial focus on women (men) will have a higher explanation focus on women (men) than chains with an initial focus on men (women).

While H1 relates to an overall effect of the initial framing, we are also interested in the process through which the focus is transmitted. Prior research has shown that discussions and competing frames can mitigate framing effects (Amsalem & Zoizner, 2022; Druckman, 2004; Sniderman & Theriault, 2004). In the present study, participants are free to express their thoughts in their own words and we measure the extent to which they use different (competing) frames, namely a focus on women and a focus on men. We expect that what focus people use in their explanations is at least partly influenced by the extent to which they encounter each comparison focus in previous participants' explanations. That is, when participants in later waves construct their own explanations, the more explanations from the preceding wave with a particular focus they encountered, the more likely they will be to use that focus in their own explanation. Our second hypothesis, therefore, states that the explanation foci are passed on within the communication chains. Statistically speaking, this refers to a correlation between the comparison foci in different waves within the chains.

Hypothesis 2 (H2): The explanation focus in participants' own explanations will be passed on to subsequent waves.

H2 refers to an explanation focus on women as well as to an explanation focus on men. We expected both to be passed on, but not in equal measure. In intergroup contexts, the focus of comparison tends to be on the group with lower status and less prototypicality or the group that is disadvantaged compared to a privileged group (Hegarty & Bruckmüller, 2013; Hegarty & Pratto, 2001; Lowery et al., 2009). Moreover, people tend to focus explanations of gender differences more on women than on men (Jun et al., 2022). Accordingly, in

communication about gender inequality, a focus on women is more common than a focus on men (Bruckmüller et al., 2013), or, using the terminology of the competing frames literature, in terms of frame *volume*, the focus on women is the louder frame. Louder frames have higher accessibility and availability (Chong & Druckman, 2007) and any effects of framing gender inequality with a focus on women or on men happen against this backdrop of a generally higher availability of the focus on women in this context. Therefore, we expect a generally stronger transmission of the focus on women than of the focus on men. This would also be in line with findings in serial reproduction studies of a longer lasting transmission for more common content and more commonly-used framings (Connor et al., 2016; Kashima, 2014).

Hypothesis 3 (H3): An explanation focus on women will be transmitted more than an explanation focus on men.

Method

Study Design

We implemented the serial communication method with three waves and two separate experimental conditions to study how two different framings of gender inequality are transmitted in lay communication, specifically in participants' explanations of gender inequality (for further visualization of the communication chains, see Figure 1).

FIGURE 1 HERE

We excluded explanations from further use in the communication chains when two independent raters agreed that a response was incoherent, too short to be intelligible, or did not contain any explanatory content. We also corrected obvious orthographic and grammatical errors in the explanations before using them in subsequent waves, for example, we changed “womn” to “women”. Furthermore, all three studies included an attention check in the form of two questions in Wave 2 and three questions in the other waves (e.g., “If you have read this question, please select ‘not at all’ as your response”). Participants who failed more than one

of these questions were excluded from the analysis.

Sample Description

Sample size in Wave 1 was pre-determined by the existing dataset (see Bruckmüller & Braun, 2020). We increased the sample size in Wave 2 and 3 to account for a decrease in effect size. Sensitivity analyses calculated in G*Power (Faul et al., 2007) revealed that our sample allowed us to detect small effect sizes of $f = .10$ ($1 - \beta = .95$, $\alpha = .05$). We recruited participants via professional services. Participants for Wave 1 had been recruited via Bilendi and had received £2 as compensation. Participants for Wave 2 and Wave 3 were recruited via Prolific Academic and received a compensation of £1.50. In all three waves, participants indicated a wide range of occupations. All participants except one lived in the United Kingdom.

There were five conditions in the pre-existing dataset of which we used the two relating to the focus of comparison as Wave 1 in the present study. In these two conditions, there were 109 participants, consisting of 51 women and 54 men, and four participants who did not indicate their gender. Participants were on average 45.2 years old ($SD = 16.1$, $min = 18$, $max = 78$; for further details, see Bruckmüller & Braun, 2020). The explanations of 86 participants (79%) fit the selection criteria for further use in the communication chains.

In Wave 2, there were 172 women, 64 men, and 3 participants who did not indicate their gender. Twenty-six additional participants had to be excluded for various reasons (18 failed the attention check, six timed out of the survey, two retracted their data, and one was not yet 18 years old). Participants were on average 35.1 years old ($SD = 11.6$, $min = 18$, $max = 74$). Most participants indicated that they had thought at least somewhat about the issue of gender inequality in leadership positions prior to the study ($M = 4.5$, $SD = 1.5$, $min = 1$, $max = 7$). Of these 239 participants, 207 (87%) gave explanations that fit the selection criteria listed above and were used as stimuli in Wave 3.

In Wave 3, 220 people remained after excluding a further 15 from the analysis (seven failed attention checks, five time-outs, three data retractions). There were 107 women, 110 men, and three participants who did not indicate their gender. Participants were on average 35.0 years old ($SD = 12.0$, $min = 19$, $max = 73$). Most participants indicated that they had previously thought at least somewhat about the issue of gender inequality in leadership positions ($M = 4.5$, $SD = 1.5$, $min = 1$, $max = 7$). Using the same selection criteria as in Wave 1 and 2, 194 responses (88%) would have been fit for use in further communication chains.

Materials and Procedure

The procedure in Waves 2 and 3 was similar to that of Wave 1. However, in Wave 1, comparison focus was manipulated via the initial description of inequality, in Waves 2 and 3, via explanations from the respective condition in the preceding wave. For exploratory reasons, in Waves 2 and 3, we added a question on participants' prior thought about the issue. In Wave 1 and Wave 3, we measured participants' perception of legitimacy of gender inequality (after participants had given their explanations). Moreover, we dropped an additional measure on suggestions for interventions from Wave 1 that had come after participants' explanations. The full materials and data for all three waves can be found here: <https://osf.io/z5prj/>).

Participants in Wave 1 had read a description of gender inequality in leadership framed either as an underrepresentation of women or an overrepresentation of men. In Wave 2 and 3 participants first indicated how much thought they had previously given to the issue of gender representation in leadership. They then read six randomly selected explanations from the preceding wave. To ensure that participants read these explanations thoroughly, they rated each one on plausibility ($M = 4.5$, $SD = 1.0$), how common they thought it was ($M = 4.7$, $SD = 0.9$), and their agreement with it ($M = 3.9$, $SD = 1.1$). In all waves, to introduce a delay between participants' reading of the manipulation and giving their own explanation,

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participants then rated the issue of unequal representation in leadership regarding importance ($M = 5.2$, $SD = 1.2$), stability ($M = 4.0$, $SD = 1.1$), and, in Wave 2, the extent to which they thought it was a problem ($M = 5.2$, $SD = 1.6$). As the central dependent variable, we then asked participants to explain the unequal representation of men and women in leadership positions in an open response. For exploratory reasons, participants also rated their agreement with different internal and external attributions for the unequal representation (six items each, $\alpha_{\text{internal}} = .81$, $M_{\text{internal}} = 3.2$, $SD_{\text{internal}} = 1.2$; $\alpha_{\text{external}} = .78$, $M_{\text{external}} = 4.9$, $SD_{\text{external}} = 1.1$) and their support for different kinds of interventions ($M = 5.0$, $SD = 1.1$). In Wave 1 and 3 participants then completed a measure of the perceived legitimacy of gender inequality ($M = 3.5$, $SD = 1.3$). Finally, we asked for demographic data. All scale-based measures used a 7-point scale ranging from 1 (*not at all / do not agree at all*) to 7 (*very much / agree completely*).

Coding of Explanation Focus

We used the same coding scheme for the explanations from all three waves. After coding the first 10% of responses, we revised the coding scheme to enhance reliability. The two independent raters were blind to experimental conditions and one was also blind to research question and hypotheses. The reliability of the final coding scheme was determined after both raters had coded 30% of responses; inconsistencies were resolved via discussion. After this, the rater blind to hypotheses coded the remaining responses.

To code the proportion of each focus in participants' responses, each response was separated into sub-statements when participants wrote more than one sentence, when the focus of explanation changed (which could happen within a sentence), or when participants gave more than one explanation. For example, the response "Men have more time, women are normally at home looking after children, men are more dominant" was separated into three explanatory sub-statements, two with a focus on men and one with a focus on women.

Overall, participants' explanations ranged from zero to 33 sub-statements ($Mdn = 3$).

We coded the focus of each explanatory sub-statement. The categories were: a focus on women (e.g., "lack of women interested in such positions"), a focus on men (e.g., "men are and will be considered as the dominant ones in life"), and neither/ambiguous (e.g., "historical reasons"). This coding was very reliable, Gwet's AC1 = .89. For further analyses, we used proportions of the different explanation foci in each participant's response.

Results

We performed all analyses using R. Data, analyses, syntax, commentary, and results can be found here: <https://osf.io/z5prj/>. H1 concerned an effect of the initial focus condition on participants' explanation focus in the two different kinds of communication chains. We tested this hypothesis with an analysis of variance (ANOVA) using the function `res.aov` from the package `rstatix` (Version 0.5.0). For H2, which concerned the transmission of focus along the communication chains, we conducted path analyses using `lavaan` (Version 0.6-6). H3 concerned differences between the transmission of the focus on women and the focus on men. We tested it by comparing the respective path coefficients via z-tests as recommended by Paternoster et al. (1998).

Hypothesis 1: Effects of the Initial Focus on the Subsequent Explanation Focus

We expected that the initial framing would affect the focus of participants' own explanations in the subsequent communication chains. While the hypothesis logically describes a main effect of the initial focus condition, statistically speaking, it translates to an interaction between the initial focus (on women vs. on men) and the explanation focus (on women vs. on men) because participants could use both foci in their responses. Even though the hypothesis concerns the communication chains as a whole, the unit of analysis needed to be the individual participants rather than the communication chain. Otherwise, the accumulation of six explanations from Wave 2 and 36 explanations from Wave 1 for each

Wave 3 response (see Figure 1) would have led to a reduction of variance within the waves, and effect sizes would have been drastically over-estimated. Accordingly, we tested our hypothesis with a 2 (initial focus on women / men) x 2 (explanation focus on women / men) x 3 (Wave 1 / 2 / 3) analysis of variance with repeated measures on the second factor. Figure 2 displays the means and standard deviations of the relative explanation focus on men and on women by wave and condition.

FIGURE 2 HERE

Hypothesis Test

The ANOVA revealed two significant effects. Overall, participants more often used an explanation focus on women ($M = .45$, $SD = .34$) than an explanation focus on men ($M = .31$, $SD = .31$), $F(1, 513) = 34.76$, $p < .001$, $\eta_G^2 = .050$. This main effect was qualified by the predicted two-way interaction between initial focus condition and participants' explanation focus, $F(1, 513) = 7.23$, $p = .007$, $\eta_G^2 = .011$. In both conditions, more explanations focused on women than on men. However, the effect was larger in the condition with an initial focus on women ($M_s = .48$ and $.29$, $SD_s = .33$ and $.34$, respectively), $F(1, 248) = 30.30$, $p < .001$, $\eta_G^2 = .089$, than in the condition with an initial focus on men ($M_s = .42$ and $.33$, $SD_s = .29$ and $.33$, respectively), $F(1, 269) = 7.31$, $p = .007$, $\eta_G^2 = .020$.

There was no significant three-way interaction between initial focus condition, explanation focus, and wave, $F(2, 513) = 2.76$, $p = .065$, $\eta_G^2 = .008$. Descriptively though, the effect of initial focus on explanation focus was strongest in Wave 1 and became smaller thereafter. In sum, throughout the communication chains, explanations more often focused on women than on men. As predicted, there was also an effect of the initial focus of the description on participants' subsequent explanation focus, even though this effect was small. A plausible explanation for this effect of initial framing on subsequent communication is that participants passed the focus of explanation on from one wave to the next. This is what H2

predicted and what we tested using path analyses (see below).

Exploratory Analysis: Potential Moderation by Participant Gender

In research on gender inequality, participant gender is often an important moderator. Therefore, we exploratively included participant gender as an additional factor in the ANOVA testing H1. The interaction effect between participant gender and explanation focus was significant, $F(1,504) = 5.86, p = .016, \eta_G^2 = .009$. Men more often used a focus on men in their explanations than women did ($M_{men} = .33, SD_{men} = .35$ vs. $M_{women} = .30, SD_{women} = .29$) and women used a focus on women more often than men did ($M_{women} = .50, SD_{women} = .33$ vs. $M_{men} = .38, SD_{men} = .33$). However, both groups more often explained with a focus on women than with a focus on men. Importantly, there was no significant three-way interaction between condition, gender, and focus, $F(2,504) = 1.62, p = .081, \eta_G^2 = .001$, meaning that participant gender did not moderate the effect of initial focus. Moreover, the two-way interaction between initial focus and explanation focus that H1 predicted remained significant when we included participant gender in the analysis, $F(1,504) = 6.33, p = .012, \eta_G^2 = .010$.

Hypothesis 2: The Transmission of Explanation Foci in Communication Chains

To test our prediction that the explanation focus would be passed on in the communication chains, we created a dataset with communication chains as the unit of analysis. In this dataset, each row represents one chain, with the relative foci of the explanation given by each Wave 3 participant, the mean relative explanation foci of the six explanations from Wave 2 that the Wave 3 participant had read, and the mean relative explanation foci of the 36 explanations from Wave 1 that the respective six participants from Wave 2 had read.

The significant interaction between initial focus and explanation focus reported in support of H1 above suggests that the transmission of focus may differ between the two initial focus conditions. Importantly, the two explanation foci on women and on men are not fully

complementary, as there was a third coding category “no focus/ambiguous focus.”

Accordingly, we calculated separate path analyses for each initial focus condition, and within each condition, for the explanation focus on women and the explanation focus on men. The resulting four path analyses have two paths. The first path signifies the transmission of explanation focus from Wave 1 to Wave 2, and the second path signifies the transmission of explanation focus from Wave 2 to Wave 3.

Transmission of the Focus on Women

As illustrated in Figure 3, there was a significant transmission of the explanation focus on women from Wave 1 to Wave 2 with a small to medium effect in communication chains with an initial focus on women (upper paths in Figure 3) and in communication chains with an initial focus on men (lower paths in Figure 3). In chains with an initial focus on women, the explanation focus in Wave 1 explained 10.2% of variance in the explanation focus on women in Wave 2. In chains with an initial focus on men, it explained 6.8% of variance. There was no significant transmission of the explanation focus on women from Wave 2 to Wave 3 and the model could not explain any variance in explanation focus on women in Wave 3.

FIGURE 3 HERE

Transmission of the Focus on Men

As Figure 4 illustrates, there was a significant transmission of the explanation focus on men from Wave 1 to Wave 2 in communication chains with an initial focus on women, where it explained 5.6% of variance in the explanation focus on men in Wave 2. There was no transmission of the explanation focus on men in communication chains with an initial focus on men. There was no significant transmission of explanation focus from Wave 2 to Wave 3.

FIGURE 4 HERE

Hypothesis 3: Comparison Between the Transmission of the Focus on Women and the

Focus on Men

We expected the more common focus on women to be transmitted more than the focus on men. To test this, we compared the path coefficients of the transmission of the focus on women from Wave 1 to Wave 2 against the transmission of the focus on men using a z-test (Paternoster et al., 1998). In the communication chains with an initial focus on women, the paths for the transmission of the focus on women and of the focus on men were similar in size ($z = 0.35$). In the communication chains with an initial focus on men, the transmission of the focus on women was significantly higher than the transmission of the focus on men ($z = 2.22$).

Overall, the more commonly used explanation focus on the underrepresentation of women was transmitted from Wave 1 to Wave 2 to a similar degree, regardless of whether the communication chain started with an initial focus on women or an initial focus on men. The explanation focus on men, however, was only transmitted from Wave 1 to Wave 2 in communication chains with an initial focus on women. This is interesting as only approximately one-fifth of Wave 1's explanatory sub-statements in that condition had an explanation focus on men. We return to this in the discussion. The transmission of focus did not continue from Wave 2 to Wave 3 for either focus or condition.

Discussion

We examined how the focus on men and the focus on women in explanations of gender inequality are transmitted in communication. To do so, we developed the serial communication method, an extension of the serial reproduction paradigm in which participants communicate their own thoughts and opinions in an experimental simulation of complex communication situations. We created communication chains of three waves in two conditions where participants wrote their own explanations of gender inequality in leadership. The two conditions differed in whether a description of gender inequality that participants in Wave 1 read focused on men or on women. Participants in Waves 2 and 3 read explanations

written by six previous participants from the same condition. We found that the subtle experimental manipulation of focus in Wave 1 had a small but significant effect on the focus of participants' own explanations in the communication chains. Moreover, participants at least partially transmitted the focus from Wave 1 to Wave 2 and, as expected, the focus on women was transmitted more consistently than the focus on men. There was no significant transmission of either focus from Wave 2 to Wave 3.

This study is, as far as we know, the first to investigate whether and for how long the focus of comparison lasts in lay communication and the first to explicitly explore serial communication rather than serial reproduction. Our results therefore provide insights for both the literature on comparison focus in framings of inequality and for the literature on the transmission of different aspects of communication.

Framing and the Focus of Comparison

As outlined above, the focus of comparison is an almost inevitable component of communication about inequality, and, we would argue, deserves more attention from research on shared constructions of reality and their transmission. It is a key aspect of individual and collective understandings of what inequality is about, specifically, the disadvantages of one group or the privileges of another (McIntosh, 2012). Moreover, evidence strongly suggests that switching the focus of comparison, a subtle form of equivalency framing, affects various outcomes (Bruckmüller, 2013; Harth et al., 2008; Powell et al., 2005) including the support for interventions to reduce inequality (Dietze & Craig, 2021; Lowery et al., 2009).

These effects of comparison focus are usually explained by the cognitive process of *focalism* (Chambers & Windshitl, 2004), that is, the increased availability and accessibility of the subject of comparison and its characteristics compared to the referent (Tversky, 1977; Wänke & Reutner, 2011). This effect may be enhanced for some framings, as research on competing frames suggests that “louder” (i.e., more common) frames, are generally more

accessible (Chong & Druckman, 2007). In the context of gender, a focus on women is more common than a focus on men (Jun et al., 2022). In line with this, our participants focused their explanations generally more on women than on men and they transmitted this focus more consistently, so that by Wave 3, this framing was equally dominant regardless of how gender inequality had been framed in the initial manipulation. Our findings therefore connect the different literatures on constructions of inequality (e.g., McIntosh, 2012), on comparison focus (Chambers & Windshitl, 2004), and on competing frames (Chong & Druckman, 2007). They also align with the recent realization that framing effects may be “real, but limited” (Amsalem & Zoizner, 2022, p. 221). Our results suggest that while the focus of comparison affects immediate reactions to inequality, these effects may not last very long when laypeople communicate about the issue and bring in their own, potentially competing frames.

One surprising finding in our study was the transmission of the focus on men in the condition with an initial focus on women. This led to a more balanced use of the different foci in explanations in the second wave. It seems plausible that the transmission of the focus on men occurred not despite of its rarity, but because of it, as unexpected or unusual aspects tend to be passed on early in communication chains (Breithaupt et al., 2018; Connor et al., 2016) and less effective emphasis frames get more attention from participants (Coronel et al., 2020). Taken together, these findings add nuance to both, the assumption that the focus in communication about social inequality focuses mostly on the disadvantaged group (Hegarty & Bruckmüller, 2013), and the previous assumptions that mainly common content or louder frames are passed on (see Kashima et al., 2018). They suggest that, in addition to accessibility and availability, other aspects such as context and communication norms – for example, the desire to add something new to a debate or to express an uncommon view – may also play a role. Future research should keep these potentially opposing dynamics in mind. At any rate, our results imply that laypeople do not simply adopt given framings from elites, but rather

bring in their own framings and thereby influence the discourse about of social issues in society.

Most of the previous research on competing frames concerns emphasis framing in elite communication and its initial effects on political attitudes (Amsalem & Zoizner, 2022). We add to this research by studying competing equivalency frames in lay communication. However, we believe that research on competing emphasis frames could also benefit from the serial communication method we developed and explored here. It strikes a balance between the two previous attempts to account for lay communication in the transmission of competing frames, the measurement of survival in rather structured serial reproduction studies (Connor et al., 2016; Coronel et al., 2020), and in relatively unstructured, open discussions between laypeople (Druckman et al., 2018).

From Serial Reproduction to Serial Communication

In this study, we adapted the serial reproduction paradigm in two important ways. First, we asked participants how they would explain a given issue rather than asking for a reproduction of content. Second, we simulated more complex communication networks by adding multiple “parents” to each statement in Waves 2 and 3. Our intent was to simulate communication processes more realistically when investigating how long different framings of gender inequality last in lay communication. However, we also see broader theoretical implications of this approach.

The serial reproduction paradigm originates in Bartlett’s (1920) research on social memory and is typically used to study the transmission of information, typically events, narratives, or stereotypes about social groups (Kashima & Yeung, 2010). It has contributed immensely to our understanding not only of the transmission of various content, but also the creation of shared reality through communication (Kashima, 2014; Kashima et al., 2018). However, we argue that to fully understand processes of cultural grounding and the creation

of shared realities, not only the content of what is said matters. It also matters *how* things are said, that is, their framing, for example, the focus of comparison. This kind of framing determines what is highlighted and put in the foreground and what is established as taken-for-granted background assumptions (Chambers & Windschitl, 2004; Hegarty & Bruckmüller, 2013). It influences, for example, whether gender inequality is constructed as a women's issue, a men's issue, or something else, e.g., a systemic problem, and it can influence the extent to which we see men as the default in leadership contexts (Bruckmüller et al., 2013; Bruckmüller & Braun, 2020). Yet, only few individual studies to date have examined the serial reproduction of framing (Connor et al., 2016; Coronel et al., 2020), and participants' task in these studies was to reproduce given content. However, to study the transmission of framing, it may be more informative to allow people to communicate their own thoughts.

We argue that a serial communication approach increases ecological validity while still maintaining enough control to analyze conversational dynamics and, when combined with an experimental manipulation, to also allow for causal conclusions. This opens new possibilities for what kind of research questions can be studied. For example, because participants have more agency, the serial communication method makes more visible and more meaningful what individuals add to a conversation – in addition to what they do or do not pass on from previous communication. This offers great potential for research questions about the role of additional variables in the communication process, for example individual level variables (e.g., communicative intent), specific communication contexts (e.g., ingroup or intergroup communication), or cultural settings (e.g., more or less common frames).

Limitations

Since the present study was a first attempt at studying serial communication rather than serial reproduction, it can only be a starting point for future research, and some aspects of it are at this point perhaps best regarded as exploratory. It would, for example, be useful to

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explore variations in the kinds of thoughts participants are asked to express (here: explanations) or in the number of responses from the preceding wave that each participant is exposed to (here: six). Moreover, to advance theory, future research may examine the role of different moderators, intergroup processes, the perception and intentions of communicators, or the role of communication norms in the transmission of different forms of framing. Importantly, in this study, we examined a very specific type of equivalency framing in one specific context, namely the focus of comparison in explanations of gender inequality. It remains an open question whether our findings can be generalized to other contexts and other types of framing. However, we believe that with this study we have provided a useful starting point for a method to investigate questions on framing effects in lay communication.

Naturally, our attempt to more closely simulate the complexity of real discourse came at the price of more complex analyses and some limitations for what kind of analyses were possible. To reduce the possibility of systematic confounds, we randomized which statements from previous waves participants saw and used relatively big sample sizes, especially in Waves 2 and 3. In addition, we separated the analyses by testing two separate but related hypotheses, one where the participant was the unit of analysis and one using path analyses to investigate entire communication chains. For our first hypothesis on the effect of the initial framing in the communication chains overall, we included Wave as a between-participants factor instead of a within-factor even though the waves are not truly fully independent. We had to do so to prevent an inflation of effect sizes. Notably, Wave as a variable is not essential for testing H1 that predicted an overall effect of the initial framing on the communication chains. We mainly included it in this analysis to provide a first indication of the dynamic of the framing effect in the communication chains before we tested the role of Wave more directly in the subsequent path analyses for H2. Importantly, Wave had neither a significant main nor interaction effect in the ANOVA for H1. However, we would suggest future

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research to keep this issue in mind and adjust the study design accordingly. Perhaps more central to our research question are H2 and the associated analyses on the transmission of focus within the communication chains for which we calculated separate path analyses for each focus and in each condition. In line with previous results that showed that competing frames diminish framing effects (Amsalem & Zoizner, 2022), we found only small effects for the transmission of focus from Wave 1 to Wave 2 and no transmission to Wave 3 in these path analyses.

The aim of the serial communication method is to get participants to communicate their own thoughts and opinions. One caveat that comes with this is that some participants may have avoided explanations they had previously read to construct an original explanation. This may have led to a subtraction effect that could reduce the transmission of framing. However, the focus of comparison is very subtle, and it is independent of specific content. It is very well possible that participants tried to come up with other content, words, or phrases, while still using the same focus of comparison in the framing of these new aspects.

One strength of the serial communication method is that it allows researchers to analyze interactions between individual-level variables and communication dynamics. In this particular study, our research question did not concern such variables as we focused on the communication itself. However, we did calculate two exploratory analyses for such measures. First, for important societal issues, such as gender inequality, intergroup processes and individual differences depending on group membership are always interesting. Indeed, female participants showed an even stronger tendency to focus explanations of gender inequality on women than male participants did. Importantly, however, we found no moderation by participant gender. Still, when added to the overrepresentation of women in Wave 2, the gender differences in framing may have led to a stronger overall focus on women in Wave 2 explanations. This may have reduced the predicted effects and may have contributed to the

focus on women being equally dominant in Wave 3 in both initial framing conditions.

In an additional exploratory analysis, we found a connection between participants' use of internal and external attributions in their explanations and their agreement with given items on respective attribution scales (for details see <https://osf.io/z5prj/>). This highlights that participants' more explicit attitudes matter for their contributions to a serial communication chain and provide an interesting starting point for further research into how participants use their agency in (serial) communication to actively shape the construction of meaning.

Conclusion and Practical Implications

Overall, our pattern of results is consistent with those of a recent meta-analysis showing that framing effects are “real, but limited” (Amsalem & Zoizner, 2022, p. 221). We showed that while the focus of comparison initially impacts lay communication, this effect washes out relatively fast in real communication. In addition, our results highlight the role of participants' agency when it comes to framing and they challenge previous assumptions of the dominant role of availability and accessibility for framing effects. Lay communication, with all its complexities, might therefore be an important moderator of framing effects.

In everyday life, researchers and journalists use reactions to news articles to estimate public opinion, for example in comment sections, letters to the editor, or social media. Our results illustrate that one should keep in mind that the framing of an article might affect the framing of the comments it gets. Depending on the focus of an article, some important aspects might not come up, while others become more prominent than their importance may warrant. This could create a false image of public opinion.

In sum, our work is a first exploration of how framing effects spread in lay communication using a new method. More research is needed on how and how long equivalency frames spread in communication to shed light on the processes behind competing equivalency frames and the moderators of when a frame becomes popular. Some of that

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research may build upon the extensive work on competing emphasis frames. However, there might be different moderators at work as the assumed cognitive processes differ between different types of framing (Chong & Druckman, 2007). With the serial communication method, we hope to have provided a powerful tool for such research.

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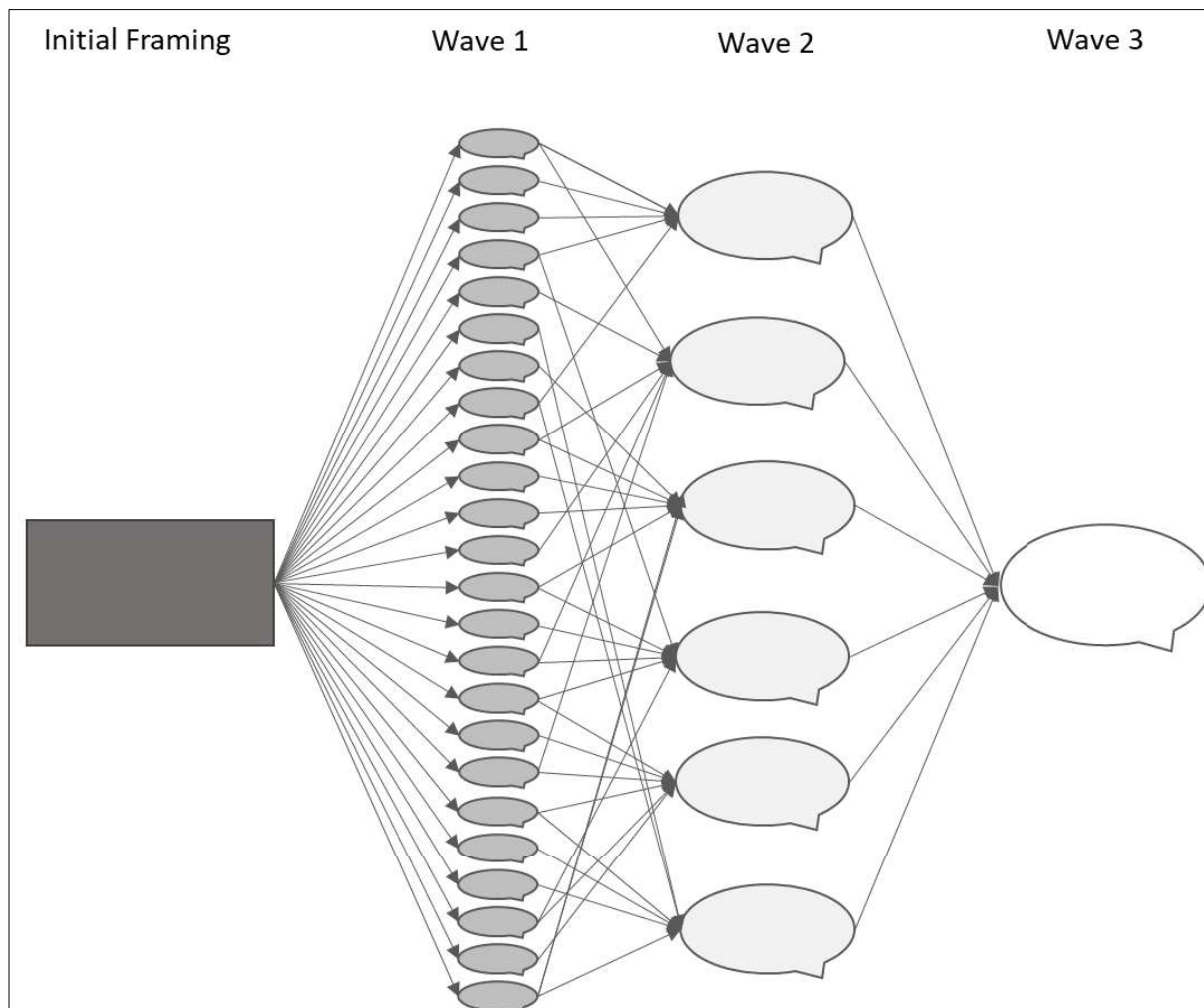
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Figures

Figure 1

Visualization of a Communication Chain Where Each Explanation is Preceded by Six Randomly Chosen Explanations from the Previous Wave



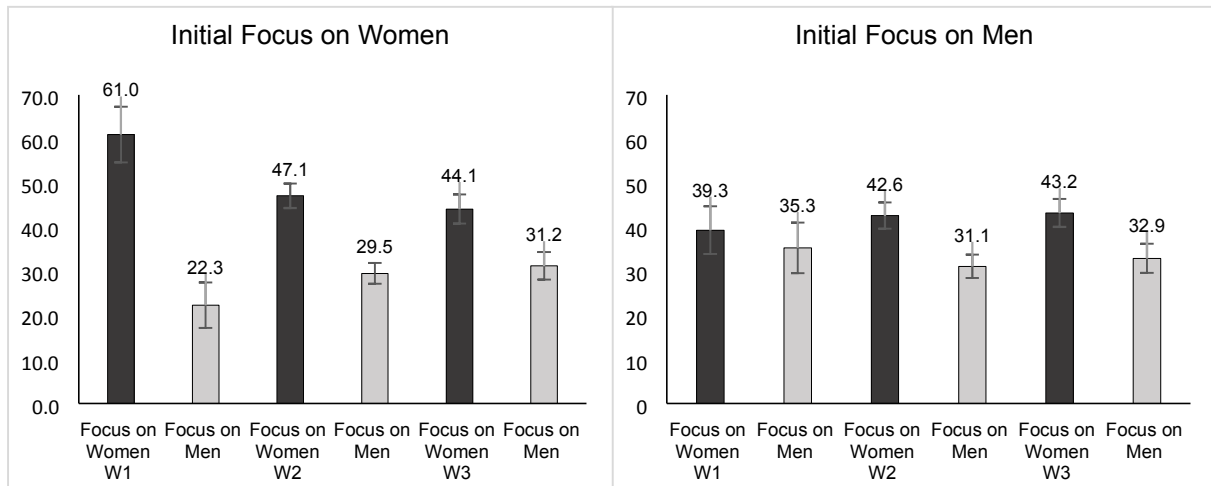
Note. The explanations were chosen at random for each participant from explanations for each wave and each condition. No participant saw the same explanation twice, but the explanations were used repeatedly between participants. Participants in Wave 1 received an initial framing manipulation of either a focus on women or a focus on men before giving their explanation. We kept these two conditions separate throughout the communication chains so that in each communication chain, all participants had read the same initial framing.

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Figure 2

Mean Percentages of Explanation Focus on Women and Explanation Focus on Men in the Conditions with an Initial Focus on Women and Initial Focus on Men by Wave



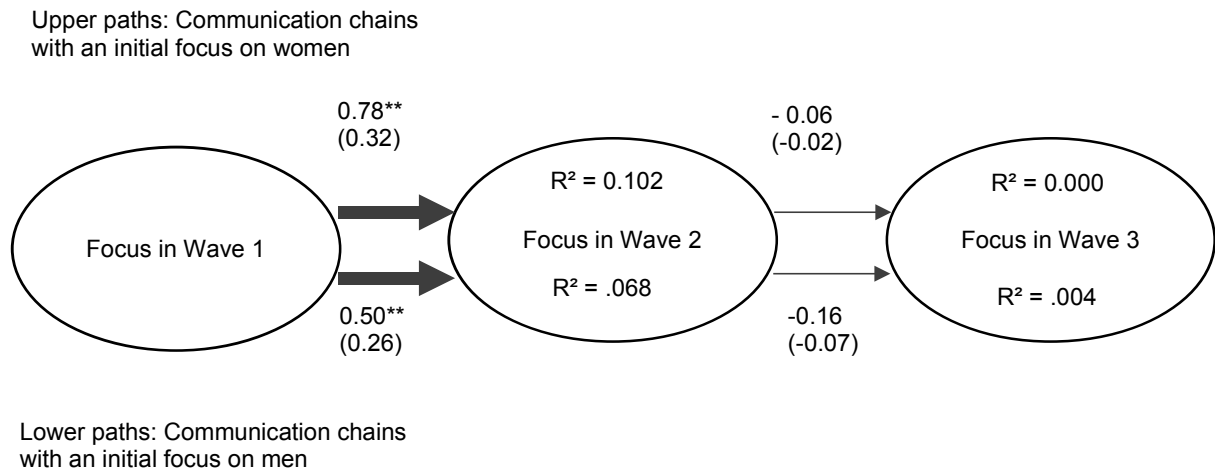
Note. Percentages do not add up to 100 because of a third coding category not displayed here, a focus that was ambiguous or on neither gender group.

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Figure 3

Unstandardized and Standardized (in Brackets) Path Coefficients for the Transmission of the Explanation Focus on Women in Communication Chains with an Initial Focus on Women (Upper Paths) and an Initial Focus on Men (Lower Paths)



Note. The upper and lower paths refer to two separate path analyses. ** $p < .010$

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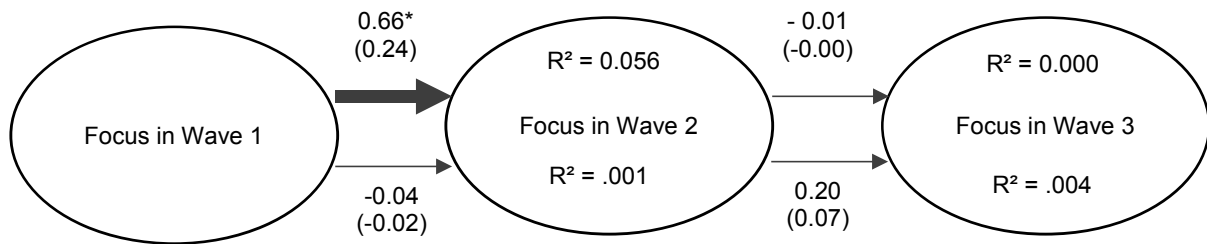
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Figure 4

Unstandardized and Standardized (in Brackets) Path Coefficients for the Transmission of the Explanation Focus on Men in Communication Chains with an Initial Focus on Women

(Upper Paths) and an Initial Focus on Men (Lower Paths)

Upper paths: Communication chains with an initial focus on women



Lower paths: Communication chains with an initial focus on men

Note. The upper and lower paths refer to two separate path analyses; * $p = .017$