

Discovery of unexpected paternity after direct-to-consumer DNA testing and its impact on identity

Michele Grethel¹  | Jennifer Lewis¹ | Rob Freeman² | Courtney Stone¹

¹Department of Social Work, University of Southern California, Los Angeles, CA

²John Jay College of Criminal Justice, City University of New York (CUNY), New York, NY

Correspondence

Michele Grethel, Department of Social Work, University of Southern California, 669 W. 34th Street, Los Angeles, CA 90007, USA.
Email: mgrethel@usc.edu

Abstract

Objective: In this study, we describe the experiences of individuals who received direct-to-consumer DNA test results indicating unexpected parentage.

Background: The availability of recreational DNA testing has left individuals navigating unexpected results with limited resources. Little is known about the emotional impact of learning about unexpected paternity.

Methods: This qualitative study used inductive thematic analysis of in-depth interviews with adults ($n = 27$; age 40–70 years) who received direct-to-consumer DNA test results revealing unexpected biological paternity.

Results: Identity transformation occurred while integrating DNA results. Themes included (a) initial discovery marked by shock, fear, crisis, and loss of genetic relatedness; (b) identity exploration encompassing anxiety, emotional challenges, determination to conduct genealogical research, and confronting family; (c) identity reconstruction due to new familial connections and reconciliation of personal and familial history; and (d) synthesis of and shift in worldview, impacting trust in kinship.

Conclusion: Identity transformation after unexpected DNA results is often accompanied by intense change in personal and community identity and a shift in identity related to race, ethnicity, religion, family status, belonging, or other facets of one's self. Temporal trauma, grief, and loss are common outcomes. Isolation, shame, and a lack of emotional support are prevalent.

Implications: This research elucidates emotional processes related to learning unexpected DNA results.

This is an open access article under the terms of the [Creative Commons Attribution](https://creativecommons.org/licenses/by/4.0/) License, which permits use, distribution and reproduction in any medium, provided the original work is properly cited.

© 2022 The Authors. *Family Relations* published by Wiley Periodicals LLC on behalf of National Council on Family Relations.

KEYWORDS

adult development, family relationships, family secrets, identity formation, stress and coping

The number of people who have had their DNA analyzed with direct-to-consumer (DTC) genetic tests more than doubled during 2017 and now exceeds 30 million globally (Bobkowski et al., 2020). In the context of genetics, it is now possible to delineate biological family relationships, discover one's "authentic" race and ethnicity, and unintentionally reveal family secrets, such as marital affairs and donor-conceived births. Using information from genetic and behavioral studies, Bellis et al. (2005) estimated that 0.8% to 30% of test recipients discover being biologically fathered by someone unexpected. A literature review found little data on nonpaternity rates; when they were reported, they were not the primary focus of the paper and lacked sufficient detail (Greeff & Erasmus, 2015). Further, extant research reports inconsistent rates and estimates of nonpaternity events or misattributed paternity findings. The most commonly cited figure in the media is 10% (Gilding, 2005).

Research on DTC genetic testing largely addresses logistics, including the history of DNA testing and the call for greater U.S. Food and Drug Administration regulations, privacy implications for participants and nonconsenting family members (e.g., anonymous sperm donors), describing motivations of consumers who use testing (e.g., health, hobby, insight into identity), and implications for medical providers interacting with patients who have received DTC genetic testing results (Allyse et al., 2018; Gill et al., 2018; Larmuseau, 2018; Strong et al., 2019). Most research conducted on the effects of DTC genetic testing results have focused primarily on health markers, such as cancer genes and chronic illness (Mahon, 2018; Middleton et al., 2017; Thrush & McCaffrey, 2010). Despite calls for genetic and mental health counselors to provide education and support for test recipients, there remains an absence of research to guide clinical practice (Kirkpatrick & Rashkin, 2017; Larmuseau, 2018; Mahon, 2018; Roberts & Ostergren, 2013).

The growth in consumers accessing genetic DTC testing inevitably will result in greater numbers of individuals accidentally learning about unexpected biological paternity. Therefore, it is necessary to understand the emotions that one endures when receiving DTC DNA results of unexpected biological paternity. The notion that the father who raised an individual or was identified as their biological parent is suddenly biologically unrelated may, understandably, cause a cacophony of emotions. Clinicians need this information to support individuals effectively as they experience the emotions associated with this stressful experience.

NOT PARENT EXPECTED

Until now, there has not been unifying language to capture the meaning of not-parent-expected (NPE) findings. In medicine, NPE paternity findings are often referred to as *misattributed paternity*. In genealogy and genetics, the phenomenon is commonly known as *nonpaternal*, or *nonpaternity* event. More recently, individuals refer to this experience as NPE, which is intended to humanize individuals' experiences, although we acknowledge that this language will likely evolve as the field advances. Historically, terminology has been stigmatized (e.g., cuckoldry, illegitimacy), and today the experience oftentimes connotes shame and secrecy for many who are managing the disclosure.

The President's Commission for the Study of Ethical Problems in Biomedical and Behavioral Research (1982) recommended that "misattributed paternity" be disclosed to both partners. Eleven years later, an Institute of Medicine (1994) committee suggested that "information on misattributed paternity be communicated to the mother, but not be volunteered to the

woman's partner (Andrews, 1994). Existing guidance is contradictory on disclosure of NPE results (Lowe et al., 2017). Consequently, genetic health professionals likely vary on how they handle incidental findings.

An online questionnaire of 200 U.S. adult residents were asked to rate the ethical permissibility of possible actions a clinician may carry out when "misattributed paternity" is identified in children (Lowe et al., 2017). Overall, respondents said the most acceptable course of action was for the doctor to discuss the paternity results with only the mother. Fathers' rights to genetic information about their children, mothers' rights to privacy and to manage disclosure, and children's rights to know about the genetic connections to their paternity remains controversial and in many cases still favors not revealing incidental findings (e.g., Hercher & Jamal, 2016; Turney 2005). Lastly, although disclosure has been a topic of consideration for more than half a century, there is little clarity around how to support or guide individuals with NPE results.

IDENTITY

Discovering one's NPE results has the potential to disrupt one's sense of self and familial identity. In the psychological literature, identity has been defined as "a self-structure—an internal, self-constructed, dynamic organization of drives, abilities, beliefs, and individual history" (Marcia, 1980, p. 159). Grounded in Erik Erikson's (1980) identity theory, personal identity research has asserted that identities are best understood as evolving over time, rather than as a static achievement; but there are clear benefits to having a clear, consistent, and strong sense of identity for positive adjustment and socioemotional functioning. Specifically, Erikson's psychosocial developmental stages emphasized that a crisis occurs at each stage, and emotionally resolving the crisis helps build psychological strengths or character traits that help one become confident and healthy. Marcia (1993) expanded on Erikson's work by emphasizing the importance of exploring and committing to an identity in a variety of life domains, such as politics, occupation, religion, and intimate relations. Marcia (2002) stated that as one navigates each life stage and takes on new roles, the demands and rewards of each stage create a disequilibrating effect that initiates a reformation of identity. However, there are unique life experiences that may evoke an identity crisis that stands out from typical development.

Understandably, one's individual identity emerges within the context of family and familial relationships (Bowen, 1978). Moreover, identity is influenced by belonging to a specific family and one's specific identity role in each family subsystem (e.g., couple, sibling, parent-child). Further, in considering family identity, we refer not only to the structural features of its ties but also to the symbolic qualities of these bonds (Thomas et al., 2017). Family relationships bind people together over time in ways that are implicitly or explicitly agreed on, even without awareness, with regard to values, meanings, rituals, and the assignment of roles (Scabini & Manzi, 2011). Baden et al. (2019) explored the relationship between the late adoption discoverer's psychological and life satisfaction, identifying themes associated with problematic emotions, relationships, and physical health. In the context of one's NPE story, and changing identity, emerges the family story.

Biology and family identity are closely intertwined with cultural conceptualizations of family. The biological view of the family underscores both family law and social policy, sometimes to the detriment of families who are united in other ways than biology. The availability of DNA testing has affected the very definition of paternity as being biologically determined by genetic rather than social markers; this shift is driven by advances in genetic medicine toward the medicalization of the family and social roles (Finkler, 2001). In this context, more weight is given to biological paternity; at the same time, acceptance is increasing for assisted reproductive technology and a range of social structures that form families. Nevertheless, the advent of

scientific techniques to determine genetic and ethnic relatedness has implications not only for health outcomes related to paternity and genetic health markers but also for identity and social connectedness (Turney, 2005).

Identity and loss

Although identity is considered to be largely cemented during the adolescence, when mature adults are subjected to uncertainty and rapid change, they may experience identity crises. Numerous circumstances and events in life can initiate identity change in adulthood, including traumatic events that inject disequilibrium into life and force the self to adapt (Evans & Coccoma, 2014). For instance, a chronic and debilitating illness may force the reassessment of priorities and, therefore, affect how one conceptualizes one's self and role in the world (Karnilowicz, 2011). Thus, change may be initiated by the individual characteristics of the person, including personality, cognitive ability, and current identity, as well as by life experience (Kroger, 2002; Marcia, 1993; Roberts et al., 2002).

Various theories and studies on loss and complicated grief (e.g., Baum et al., 2005; Bellet et al., 2020) posit that the more significant an individual's relationship to a person or thing, the larger the shift in identity or identity restructuring will be upon its loss. Loss resulting in complicated grief (Bellet et al., 2020) or loss that is difficult to understand by the person experiencing the loss (Gillies & Neimeyer, 2006) can cause identity confusion and increased distress. This can be due, in part, to one's loss of a "part of oneself," which results in diminished concept of self-complexity and greater identity reconstruction. Studies show that ambiguous loss, one that ends without closure or clear ending or leaves unanswered questions (e.g., knowing a missing person, adoption, & immigration separation), are some of the most traumatic types of loss (e.g., Boss, 2010). When the trauma of loss occurs, especially those losses that may not be felt, seen, or understood by an individual's social supports, a shift in one's identity and self-concept take place to accommodate the feelings of both absence and presence of the loss. This identity change often includes broadening roles and assumptions by the individual experiencing change (Baum et al., 2005). This change may be helped or hindered by many factors, including age, cultural background, spiritual orientation, and socio-economic status (Boss, 2006, 2010). Reasonably, a natural response of learning of one's NPE story may include grief and loss, which needs to be understood in the context of the myriad emotions expressed during this process.

It is critical that research explore the experiences of individual NPE journeys from receipt of DNA results through the myriad subsequent events and emotions. Clinicians need this information to design ways to support individuals effectively as they experience the opportunity and burden of transforming their identity and roles within their family. At present, the limited understanding of the emotions associated with learning of NPE paternity has left individuals feeling isolated and misunderstood and with few resources for support.

PURPOSE OF THE PRESENT STUDY

The purpose of this qualitative study is to describe the experiences of individuals who have received NPE results after DNA testing. We explore the effect of NPE results on individuals' personal, familial, and ethnic identities. Our approach considers a range of ways these unexpected discoveries are explored, impacts on one's identity, and the emotional ramifications of these discoveries. We focus on the initial discovery of NPE results, exploration of biological families, familial connections, reconciliation of personal and familial history, and synthesis of overall sense of kinship.

METHODS

Participant characteristics

This study draws from 60-minute, in-depth, qualitative interviews with 27 participants who had received DNA test results revealing an unexpected biological parent. Participants were between the ages of 40 and 70, and the mean age was 51.7 years; 69% were women, and 31% were men. The majority were White (86.2%), and the race or ethnicity of other participants were evenly distributed among Asian or Pacific Islander, Hispanic or Latinx of any race, Black or African American, and other. One participant had become aware of their DNA NPE results within 3 days before being interviewed, 17% within the past 90 days, 10% within 3 to 6 months, 10% within 6 to 9 months, 21% for 1 year, and 24% within the past 2 years. Of the participants, 31% held a graduate degree, while 31% held a bachelor's degree, 27.6% had attended some college, and 10.4% had not attended a college institution. During the time of the interviews, all participants lived within the United States.

Recruitment

Participants were identified through an announcement for a research study on a social media page created by and for individuals who have participated in DNA genetic testing and received unexpected biological paternity results. The social stigma around NPE status within the family context remains high, reducing access to study this population openly, limiting our participant pool. Participants had to have been living in the United States at the time of the interview and between the ages of 40 and 70 years at the time of the interview. This age range was selected because people under age 40 years would have grown up with exposure to the Internet and DNA testing, making them a qualitatively different group of subjects; our future work will investigate their experiences. Participants over age 70 years are less likely to have living parents with whom they can discuss results, making their experience quite different from other participants. Their experiences, as well, should be considered in future research.

Procedures

Qualitative interviews were conducted separately by two practicing clinical social workers who hold faculty positions at a Southern California social work program and have separate private psychotherapy practices in the Northeast and West Coast of the United States. Interviews took place between December 2019 and March 2020. Each participant provided written informed consent, and no compensation was offered. All interviews were conducted remotely by telephone and were digitally recorded and then professionally transcribed, reviewed, and edited as appropriate to ensure accuracy. All identifying information has been removed or altered, and pseudonyms have been used to conceal participants' identity.

Interviews followed a semistructured, in-depth qualitative interview guide designed to address four primary questions. Participants were asked the following:

1. How did you come to your decision to do a DNA test and what were the unexpected findings? If the findings were not a complete surprise, please share why they were not a complete surprise, and please share your process of uncovering the results.
2. What was your initial reaction and what did you do, if anything, with the information?
3. What has the impact of this information been on you, your family, your community, and your culture? How has this changed your identity (cultural/ethnic), relationships, and worldview?

4. What do you think, if anything, would be helpful for the mental health community to understand regarding your journey, and to support your emotional health and or your larger community?

Data analysis

Data analysis was conducted via Dedoose, a web-based software application developed for mixed-methods research and qualitative data analysis. Our research team included the two aforementioned qualitative interviewers, as well as one graduate research assistant and one qualitative research consultant, each experienced in ethnographic research and qualitative data analysis. We used inductive thematic analysis (Braun & Clarke, 2006) to identify patterns in participants' responses, while also remaining attentive to our underlying assumption that there is likely a developmental, albeit not necessarily linear, process involved in coping with NPE results. First, all three researchers immersed themselves in the qualitative data by checking each transcript against the corresponding audio file to ensure accuracy. Next, an initial codebook was developed by the research team based on this initial immersion and domains of inquiry as established vis-a-vis the semi-structured qualitative interview questions. Codes developed during the formative stage of data analysis included the following: context of DNA testing, changes in worldview, disclosure, initial impact, emotional processing, impact on identity, social and familial impact on birth certificate father (BCF) and biological father, implications for mental health, and outstanding questions/loose ends. To establish intercoder reliability, each of the four research team members then independently coded the same five, randomly selected interview transcripts and met via Zoom to compare code application, discuss discrepancies, and refine code descriptions where necessary. Ultimately, we decided to retain the initially developed codebook, with substantial edits to descriptions.

Once consensus was reached regarding code description and application, the research team divided the remaining 22 interviews among themselves to code individually. Throughout the data analysis process, all four research team members met weekly via Zoom to discuss relevant findings, reevaluate coder agreement, and add new codes when necessary. During initial coding, researchers identified identity transformation as a unifying core category. During the research team's review of all 27 coded interviews, identity transformation was further refined and divided into the following four primary themes: initial discovery, identity exploration, identity reconstruction, and identity synthesis and shift in worldview. Next, we describe an overview of the results, followed by a detailed description of each of these themes.

FINDINGS

Overview of findings

More than half of the participants submitted DNA material to a DTC genetic testing company to learn about their ethnicity and national origin. Other participants described receiving a DTC DNA kit as a gift, purchasing it from a "big box" discount store, and participating in DNA testing for enjoyment. Importantly, although some participants reported having harbored suspicions about their family histories before participating in DNA testing, none directly sought to confirm or deny biological parentage through DNA testing. Both within and across interviews, participants reported a relatively wide variety of emotional responses, ranging from psychological numbness to visceral anger, and recalled both contemplating and taking actions which included self-isolating, joining online support groups, and seeking solace from friends, family, and occasionally professional counselors.

Overall, however, participants routinely described experiencing a profound sense of grief and loss after receiving their NPE results, as well as an unstable sense of who they were in context of their family of origin. The majority of participants also expressed a lack of understanding from their family and peers regarding the enormous extent to which this revelation affected their life, including their sense of self. Notably, despite having varied personal and familial histories and ultimately embarking on individually distinct emotional paths, all individuals in the present study recalled being told from childhood that the father who raised them was their biological parent and described a profound identity transformation as a direct result of their NPE discovery. These overarching similarities, detailed in what follows, resulted in a framework describing the process of synthesizing NPE results.

Theme 1: Initial discovery

Subtheme 1a: Traumatic response to NPE results

No participant in the present study described an indifferent or positive reaction to the initial discovery of a previously unknown biological parent. Instead, participants reported feelings of shock, denial, anger, fear, unexpected crises, confusion, and isolation. Additionally, participants described a loss of genetic relatedness, as well as a fear of potentially losing connections not only to one's father but to one's birth-certificate family. Extreme emotional responses and bodily sensations such as feeling frozen, dazed, dysregulated, or as if one were living in a fog were all trauma-like responses expressed by participants. Upon learning of their NPE results a few participants retroactively recalled feeling somewhat doubtful about their family histories, but most described feeling utterly overwhelmed upon receiving and interpreting their results. For nearly all participants, the initial reaction can be characterized most accurately as a shock—not only about what they had understood to be blood familial relationships but also about the core of their identity.

To illustrate, one participant discovered that they were not biologically related to the person known as their birth father less than 3 months before being interviewed. Like many participants, their initial reaction was one of both disorientation and concerns about the change in their familial relationships, frequently using metaphors in this initial discovery to surviving a natural disaster:

Oh my gosh. I couldn't even see. All I could see was like a whirling tornado. Like, I don't know it felt like a frickin' tornado over my head. It was surreal. I felt like I was losing my family. Just like a tornado. When things fly out of a tornado. I felt like my relatives were going to be ripped away. ... Relatives just like being ripped away from me. And I just, I was numb. I just didn't know. It was weird. I was upset. I was, just then I had to calm down and realize, okay they're my family. It's okay, bring yourself back to the present.

Subtheme 1b: Life-altering revelation

Participants described experiencing alternating waves of emotion, including feelings of confusion, anger, empathy, and devastation. For example, one participant had received NPE results 1 year before being interviewed. After purchasing commercially available DNA test kits for their family as a Christmas gift and as a way to learn more about what they had been told was their Native American heritage, they learned that the man they had known as their biological father, recently deceased, was biologically unrelated. They had “never felt that something was

off” with their father or family, and consequently described feeling a fundamental change in their sense of self, including a lingering uncertainty about their past and enduring feelings of guilt about potentially “dishonoring” their father:

You know since they’re gone I don’t have any answers to questions. Like I don’t know if my dad knew or not that I wasn’t his. And I don’t know if my mom was hoping that he was still my dad. ... It is as if you feel, it’s like a shift. It’s a shift in your ground. It’s just different.

Like many participants, their initial discovery had unexpectedly transformative effects, including anxiety over sharing this news and facing the undue burden of holding space for all family members’ feelings.

Similarly, another participant submitted DNA to DTC genetic testing services 2 years before being interviewed to learn more about their Irish heritage. They discovered that their biological father was not who they had thought and described being “a little bit shell-shocked,”

It’s like at first that’s all you can think of. And, I was extremely, um, you’re sort of just in a daze. I don’t even know how to describe it. I was very much in a daze. I think when something like this had happened to somebody else I knew, or I used to cry after DNA shows, a really tearful moment, I used to cry a lot. But like after it happened to me, I don’t cry. I’m numb. And I almost can’t feel anything about it. Which is really odd for me.

Although they reported having always wished for a family with whom they felt more aligned, like many participants, they nonetheless experienced the initial discovery of an unexpected biological parent as highly disorienting.

Theme 2: Identity exploration

Subtheme 2a: Genealogical Genetic Investigation

Following the discovery of a previously unknown biological parent, many participants actively engaged in independent investigative work to learn the identity of their newly discovered relatives. Participants described this as all-consuming, highly anxiety-inducing, and marked by both extreme emotional challenges and the surreal excitement of having newly found genetic relatives. Many reported conducting extensive Internet searches for their biological families, as well as attempts to confront their birth certificate families with their DNA test results. As a 54-year-old participant living in the Northwest recalled,

And so I started sleuthing, and I ended up testing everyone on my dad’s side of the family. And then also I started going to this woman’s site on ancestry and looking at her family tree. And I kind of came up with the idea, narrowed it down to just one man who I thought was my dad.

In general, regardless of the manner of engagement, participants reported that mothers, in particular, often responded unapologetically, often expressing anger that long-hidden family secrets had been revealed. As a result, some participants expressed a strong need to create emotional distance with their mothers, whereas others recalled disengaging with mothers and other family members altogether.

Participants also described struggling to become managers of family secrets while simultaneously dealing with emerging sibling jealousy, often resulting in further emotional and logistical burdens. One participant learned the identity of their biological father after assisting their son with his own DTC DNA test results and discovered that the person they had believed was their uncle was actually not biologically related to them. After confronting their mother and feeling dissatisfied with what they considered to be a disingenuous response, they decided to conduct their own Internet research. As they recall,

I'm like, I just want to know my secret. I want to know my truth and I want to move on. ... So I put my investigative hat on. I'm luckily self-employed and have a job. I literally was so obsessed I look back and I don't know how I lived. If I did anything. If it wasn't for my son and my husband I literally sat in front of my computer. I gained 50 pounds that I lost a little bit. I didn't go to the grocery store. I didn't leave the house. I drank wine. I ate Ruffles and Ranch Dip and I sat in front of that computer. And I think that made me not think about it.

At the time of their investigation, they encouraged their family members to obtain their own DNA test results under what they regarded to be slightly false pretenses, an option they chose to get at what they regarded as a fundamental "truth."

Similarly, another participant who submitted their DNA sample to a genetic testing service along with their son "for fun" and to learn more about what they, then, understood to be their German ancestry. They described falling to their knees upon receiving the NPE results:

So all that happened once I was able to catch my breath, my cop skills went into place. I had been a cop since 2003 and was a detective as well. So my skills kicked in and I started calling etc. ... I wanted to take control of myself and I said this has happened. I'm actually excited about it, because the man on my birth certificate I've never had a relationship with and it's kind of an adventure for me.

For this participant, a career law enforcement officer who referred to themselves during the interview as generally "a very strong [person]," utilizing their investigative skills to proactively locate and connect with their biological family was the key to moving forward.

Subtheme 2b: Investigative barriers

Overall, the theme of identity exploration was described by participants as laden with numerous barriers to learning more about the situations surrounding their births and childhoods, including a lack of clarity regarding whether deceased birth certificate fathers were aware of their non-biological relatedness to the participants; biological mothers who were deceased or unwilling to share information about their biological father; new biological families resisting or denying information or rejecting introductions; and a fear of confronting birth mothers due to physical health or aging-related memory loss. A 63-year-old participant from the Southeast of the United States, who had known of her their NPE status for less than 6 months, shared their experience in this regard:

She never wanted me to think anybody else was my father, except my father. And he and I ... we didn't have really good connections. So I think that probably made it worse but that she felt that if she did tell me it would make it worse. Rather than actually making me more appreciative.

Nonetheless, many did report receiving positive responses from their biological fathers and their NPE families, and others noted that informing their birth certificate fathers and communicating with family members helped them feel seen and validated their emotional responses. Lastly, some participants described being left with more questions than answers.

Theme 3: Identity reconstruction

Subtheme 3a: Reconciling of familial narratives

For most participants, the discovery of an unexpected biological family was seen as an opportunity not only to form new familial connections but also to make sense retroactively of various other aspects of their lives. Many participants used this information to reconcile histories of adoptions, infidelity, sibling rivalries, and hereditary genetic conditions. For others, previously unexplained phenomena such as tastes, talents, and otherwise unexplained attractions to religious and cultural traditions other than one's own were suddenly rendered intelligible. One participant described having lived with a sense of disconnectedness with their family, including a sense that their parents had been dishonest about their family ancestry. Shortly after their mother passed away, leaving few other options to learn more about their family heritage, they decided to participate in DNA testing, during which time they discovered the existence of a rather extensive unexpected family. They described the impact that this discovery had on their own identity, as follows:

It was really, really, really, weird to even write my name. I'm an artist. I have a lot of art with my signature on it. And in my field of work. I'm very well-known and to see my name show up on things and it just felt very like false. Very, like I'm a big fat lie. I'm a big fat lie. My name is a lie. I'm a lie. I'm a total lie. And I don't—it was very hard for me. That was really something that took me about 6 or 7 months to come to terms with. That I'm not Italian. I would always say I'm Italian and I'm coonass—coonass is slang for a Cajun person. I'm a Sicilian and I'm coonass. I'm generally programmed to cook. I've been saying that phrase my whole life. And [then I find out] I'm not Sicilian. I'm just not. Really, I just can't even explain how strange it is.

As was the case with many participants, the discovery led them to investigate the contradiction inherent in being one thing socially and another thing biologically. They expressed the need to reconsider not only their relationship with their familial ethnic identities but with their artistic and culinary inclinations as well.

Subtheme 3b: Integrating NPE relationships

Another participant who had always known that they were adopted thought they had successfully located both of their biological parents in their late teens and 20s. However, 1 year before being interviewed, they learned through a commercial DNA test that their biological father was not the person they had previously thought. They describe connecting with their newly discovered biological family as feeling “like my puzzle is finally complete [because] I know who all my people are.” They continued:

On Thanksgiving whenever I call people I say gobble, gobble. He [my NPE father] called me, the first thing out of his mouth was gobble, gobble. I was saying that at

the same time. We just laughed our asses off. It's great. There are things that I got from him. It's weird. I never had that before, with anybody, even with my mother when I met her there wasn't—I didn't feel like mushy or like, oh my gosh this is my person. It was like okay you birthed me. And that was our connection and it wasn't like, I never felt love from her. And I felt that from him, from moment one.

Although one of the concerns that participants frequently noted experiencing after first receiving NPE test results stemmed from uncertainty regarding how this new discovery would affect their existing family dynamics, many participants described this time as an opportunity to develop new relationships with biological fathers, when available, who were typically surprised to learn that they had a child, wanted confirmation, and engaged in a process of reconciling historical challenges and paving a path toward developing a relationship.

Theme 4: Identity synthesis and shift in worldview

Subtheme 4a: Social implications of NPE discovery

Long-term effects of discovering a previously unrecognized biological parent were also common. In addition to pragmatic concerns, such as genetic predispositions to various medical conditions, many participants noted that the events surrounding their NPE results had a resounding impact on their overall worldviews. The importance of biology and genetics, views on adoption, a sense of overall trust and stability, and broader conceptualizations of the meaning of kinship were among the changes most frequently discussed. "When I see families together I scan the children to see if they look like their parents. ... I can see people and be like, oh yeah those kids aren't his."

One participant learned of their unexpected biological parentage after they and their children sent DNA samples to a genetic testing service as a Christmas present, intending to learn more about their late father's family ancestry. The participant learned that members of their extended family shared DNA with one another, but not with them or their children. They said,

What it makes me think is that we aren't all what we think we are. We have no idea that we're something. It can change in a moment. You think you know your family, but you might not. You might not know your family. ... Betrayal, betrayal, not knowing who you really are.

As with many participants, NPE results left them with lasting uncertainty regarding not only their family's identity but also their own.

Subtheme 4b: Coming to terms with one's NPE reality

Similarly, another participant and self-described "amateur genealogist" noted the following:

You're kind of in this land of being an imposter. You feel a little bit like you're pretending to be part of a club that you're not really part of. And even if you feel like maybe if you told them they'd be like, "Oh that's fine. We love you anyway." You're just being an imposter. That's what it feels like to me, imposter syndrome. So I think that's hard. Because you can't. ... There's no win there. It's bad if you do and bad if you don't.

Likewise, another participant originally tested to learn more about their ethnic background, only to learn eventually that they were the result of an affair between their mother and biological father. They note that their worldview has not necessarily fundamentally shifted, but their concept of what it means to have a “normal family” has:

I think for me it's just more, it's more evidence like there's no such thing as normal and that there is no such thing as a normal family. It just doesn't happen. But that has been something that I've thought more and more as I've gotten older. Everybody has interesting or bad or complicated parts of their family. That's just how it is. So, I don't—I don't think it necessarily changes my worldview. Some of the things that I see on the Facebook page makes me feel really terrible for people. Because I think if anything is normal, I think my life is actually pretty normal. So just to see some of the circumstances that people are struggling with, and dealing with all of this, it's a little sad to see that.

A final participant succinctly sums up their experience as follows: “Now I'm living in the truth. That's what, that's what's, important. Yeah, it hurt. It hurt like hell. But now I'm living in the truth.”

DISCUSSION

Overarchingly, the current study fills a gap in the literature by describing individuals' experience upon receiving NPE results. It points to a radical transformation in both self and familial identity upon receiving NPE results. The overwhelming experience of being abruptly confronted with conflicting information regarding one's experiential and genetic identity often conveys very different connotations about one's own personal identity, at times introducing a marked tension between conceptions and experiences of relational identity and essentialized kinship. At odds are conceptualizations of heredity, family and social environment, and nature versus nurture. Identity transformation after NPE results is posited here as intense transformation in personal and community identity, as well as a shift in identity related to race, ethnicity, religion, family status, belonging, physical attributes, personality type, or other facets of their identity.

As with any process of change, individuals travel through NPE-related identity transformation differently, and for many, this information will remain an ongoing revisiting of exploration, reconstruction, and synthesis. For others, this might mean never fully landing in a place of synthesis or integration due to misinformation, lack of closure, deceased family members, non-disclosure with living relatives, preexisting family discord, or other reasons unique to their situation. In essence, there is no common agreement that tension about this new information would ever be completely resolved. In all cases, participants reported being glad they tested and said that they would do it again if they had to, even if they experienced challenges while confronting their mother or were rejected by either their biological or birth certificate father.

Initial discovery

The initial NPE discovery is frequently experienced as a deeply stressful and often traumatic event that overwhelms an individual's ability to initially cope with myriad emotions. Further, this process evokes identity change for which it can be difficult to sort through and to obtain validation and comfort from others. In the present study, the experiences of loss are often akin to that of other nondeath losses, which often go unacknowledged or are unattended to by those close to the affected individuals. Moreover, this research supports the idea that the ambiguity of losing genetic

relatedness to a parent, yet having them present in one's life, can create a unique kind of loss that is experienced both psychologically and physically. Ambiguous loss (Boss, 2000, 2006) is suggested here, as likened to the complexity of loss incurred by experiencing NPE results. Understandably, learning that one is not the child of the parent one had known all their life, leads to loss, grief, anger, and betrayal. Virtually every aspect of life is conceptualized within the context of one's parents (Beenstock, 2012). Ambiguous loss is different from losing a parent by death, in that ambiguous loss is inherently traumatic because the inability to resolve the situation causes pain, confusion, shock, distress, and often immobilization, thereby freezing the grief process and defying resolution (Boss 2006, 2010). Moreover, experiencing this kind of loss is similar to one's NPE story, in that the loss of the loved one, father known to them throughout their lives, effects an initial intensity and persistence in one's reactions, along with a sense of being off balance. Further, this type of loss fuels changes in interpersonal relationships, behaviors, social roles, and even in the ways in which one views oneself.

The grief incurred when learning of one's NPE story is often greatly misunderstood by others. Disenfranchised grief is loss that is not acknowledged by society (Doka, 1989). Grief and loss are framed within a hierarchy of human experiences, but many losses are disqualified, unacknowledged, or not discussed because of social stigma. This is the case for those who experience NPE loss. Heretofore, there has been limited language to help individuals place this type of loss within an acceptable framework, which leaves many feeling isolated and further grieved due to lack of understanding of the complexity of losing a parent who has never been in one's life or of learning that the father who has been in one's life is no longer genetically related.

Inevitably these DNA surprises result in enormous barriers to managing this traumatic experience with family and friends because there is an inherent secret within the results that needs exploration before assimilation and integration. Frith et al. (2018) stated that what is kept secret is secret for a reason. Secrets are not simply missing "factual accounts" about the family. They are stories created that distort the "facts" to provide an account, a display of family that reflects what is perceived to be important in this family (and social) environment. Disrupting the secret requires unraveling many aspects of family (Frith et al., 2018). This is an enormous burden for individuals who may already be traumatized and vulnerable due to the unexpected DNA results. Not only are they trying to process the deception and betrayal of learning the truth about their genetic history, the secret becomes a primary barrier to gathering information and exploring the NPE experience.

Identity exploration

The theme of identity exploration is marked by an intense search for meaning related to how one's DNA results might be best understood and interpreted. For our participants, a first step in understanding their birth stories and piecing together their new narrative is stabilizing and finding hope and restoration. Initially, this time consists primarily of efforts to positively identify one's biological father, which almost inevitably involves making difficult decisions regarding whether and how to confront the members of one's birth family. We found that within the exploratory time, participants often titrate between (a) learning new information and (b) beginning to metabolize birth stories, family histories, generativity, generational trauma, multiple generations of NPE, and the creation of a new, more inclusive narrative. Ideally, this meaning-making eventually leads to some sort of logic, coherence, or rational reasoning about what has happened. This investigative approach often involves an all-consuming drive to figure out what happened, tempered with internal conflict about what to do with the information that was uncovered, marked by a fear of rejection or anger. For some, questions of paternity will remain unanswered.

Identity reconstruction

Although identity exploration sometimes blends into identity reconstruction, there seems to be a clear distinction of these two themes. In the first, one explores information, handles confrontations, meets new family members, learns of NPE father's death, or begins to accept the news. This leads to the second theme, which involves identity reconstruction. Identity reconstruction describes individuals' efforts to integrate newly obtained information into their existing lives. It is understood that trauma makes people feel powerless, helpless, and groundless (Center for Substance Abuse Treatment, 2014). It is posited here that uncovering family secrets and placing one's birth story or genetic history in some context grounds individuals to move through and integrate their new stories. Viktor Frankl's (1963) seminal work, *Man's Search for Meaning*, asserted that people are driven by a psychological need to find or create a sense of meaning and purpose in their lives, and that this drive can power their capacity to face and transcend even the most horrific of experiences. Herman (1992) later suggested that trauma and loss involve the reconstruction of meaning, rebuilding of hope, and the sense of empowerment necessary to regain control over one's being and life. This could also be framed as sensemaking, a process of social construction through which we attempt to explain surprising or confusing events. Sensemaking offers an important way of dealing with trauma (Solomon, 2004). Further, post-traumatic growth theory suggests that transformation following trauma, in which survivors of trauma come to terms with their losses, reframe their experiences and even "find the silver lining" in what has happened to them (Schwartz, 2020).

Identity synthesis and shift in worldview

The last theme, identity synthesis and a shift in one's worldview, reflects a change in a fundamental sense of the world and how participants see themselves with hindsight. During this time, individuals consider essentialism, forgiveness, distrust, empowerment, resolution, new relationships, ending relationships, and reflections on the unexplainable connection individuals have when meeting new family members. At this time, individuals are reflective and are developing deep connections and relationships with new family in ways that some have never experienced. Although nature versus nurture was always hovering in the narratives of these stories, participants describe surprises around their view of biology as having an essential role in this process. It is unclear whether learning about genetic concepts contributes to implicit associations or whether implicit genetic essentialism is universal. Further, the cross-cultural and developmental evidence for essentialism suggests that people may be universally predisposed to think in essentialist ways, although studies of genetic essentialism have largely been limited to Western adult populations (Gould & Heine, 2012). Although stories of medical information were paramount in the narratives, the subjective sense of risk and one's actual risk may not often be at stake here; rather, the information was shared to make informed decisions about health-related issues.

Learning NPE results is understandably the topmost difficult and challenging experience in one's life. Uncovering family secrets that explain aspects of individuals' lives that had previously been disjointed can provide a new sense of wholeness and belonging. This transformed identity is collapsed into new narrative structures or stories to give context for understanding the experiences (Etchison & Kleist, 2000). Narratives are defined as means of communication that reflect time-ordered events with a discernible plot and cast of characters and that impart personal and cultural information from the teller to the audience in a coherent whole (Hall & Powell, 2011). Telling one's story in a welcoming environment is an essential part of sensing that one's self is being seen and for dissolving secrecy and shame as one integrates one's new self.

Limitations and directions for future research

There are several limitations to this qualitative study. Foremost, this study was limited by the small amount of extant research on NPE results. The findings could be limited by the purposive sampling of individuals who accessed a private online Facebook group. Further, purposive sampling and focus on this population are consistent with the goals of qualitative research, which aims for depth rather than breadth (Freeman et al., 2020). Further, social media platforms provide a rich opportunity to reach diverse populations that would otherwise be difficult to identify (Franz et al., 2019). Although the sample size was sufficient for a qualitative exploration of this nature, it did not allow us to examine age, sex, or racial/ethnic differences in detail, a gap that future studies could undertake. Future research would benefit from including younger and older age groups. Race and ethnic diversity were greatly missing from this study, as well as gender parity, which limits generalizability. The social stigma around this topic remains high, reducing access to study this population openly. Future research should explore risk and protective factors to enhance resilience during this difficult experience.

Clinical implications

Due to the paucity of research in this area, our clinical implications come directly from participants, who noted several things that were both helpful or harmful as they processed the information they received. They generally described needing to navigate identity transformation with limited support systems in place or knowledgeable clinicians to guide them through the process. This transformation elicited myriad emotions, including profound grief and loss and personal change that has social stigma associated with it. Additionally, they described a surreal experience of not belonging and reevaluating a lifetime of memories and relationship, scanning for authenticity and genuineness.

Participants described a need for informed mental health and social support. Further, participants shared that access to clinicians soon after their NPE discovery would support and guide them through the NPE discovery and the processes of seeking out biological family, maintaining familial connections, and reconciling personal and familial history to reduce emotional distress and unhealthy coping mechanisms. It is evident from participant stories that individuals would benefit from clinicians' knowledge of the themes associated with this process as they navigate the short- and long-term effects associated with managing the emotions and family relationships that are upended from coming out about one's NPE story. Considering Bowen's (1978) family system theory, which purports that the family is both a relationship system and an emotional system whereby family members influence and are influenced by one another at individual, dyadic, systemic, and intergenerational levels would be useful when framing an individual's NPE story. Utilization of a trauma-informed approach to support someone navigating an NPE journey was articulated by participants as essential to understanding the complexity of emotions associated with integrating one's NPE story. Instances of feeling retraumatized with statements such as "he is still your father" were often experienced as misunderstanding the complexity of the NPE story, as well as perpetuating concealed stigmatization with which participants were already reckoning. Lastly, knowledgeable clinicians can provide practical assistance to individuals—for example, to help avoid impulsive missteps or unnecessary delays in accessing family members.

In conclusion, this study provides the beginnings of information to guide clinicians as they work to engage clients in a way that allows them to investigate all the meanings these results have. Further clinical research will elucidate how to support those navigating NPE discoveries and journeys.

ORCID

Michele Grethel  <https://orcid.org/0000-0002-5353-8037>

REFERENCES

- Allyse, M., Robinson, D., Ferber, M., & Sharp, R. (2018). Direct-to-consumer testing 2.0: Emerging models of direct-to-consumer genetic testing. *Mayo Clinic Proceedings*, 93(1), 113–120. <https://doi.org/10.1016/j.mayocp.2017.11.00>
- Andrews, L. B. (1994). *Assessing genetic risks: Implications for health and social policy*. National Academy Press.
- Baden, A., Shadel, D., Morgan, R., White, E. E., Harrington, E. S., Christian, N., & Bates, T. A. (2019). Delaying adoption disclosure: A survey of late discovery adoptees. *Journal of Family Issues*, 40(9), 1154–1180. <https://doi.org/10.1177/0192513X19829503>
- Baum, N., Rahav, G., & Sharon, D. (2005). Changes in the self-concepts of divorced women. *Journal of Divorce & Remarriage*, 43(1–2), 47–67. https://doi.org/10.1300/j087v43n01_03.
- Beenstock, M. (2012). *Heredity, family, and inequality: A critique of social sciences*. MIT Press.
- Bellet, B., LeBlanc, N., Nizzi, M., Carter, M., van der Does, F., Peters, J., Robinaugh, D., & McNally, R. (2020). “Identity confusion in complicated grief: A closer look”: Correction. *Journal of Abnormal Psychology*, 129(6), 543. <https://doi.org/10.1037/abn0000631>
- Bellis, M., Hughes, K., Hughes, S., & Ashton, J. (2005). Measuring paternal discrepancy and its public health consequences. *Journal of Epidemiology and Community Health*, 59(9), 749–754. <https://doi.org/10.1136/jech.2005.036517>
- Bobkowski, P., Watson, J., & Aromona, O. (2020). A little bit of that from one of your grandparents: Interpreting others’ direct-to-consumer genetic ancestry results. *Genealogy*, 4(2), 54. <https://doi.org/10.3390/genealogy4020054>
- Boss, P. (2000). *Ambiguous loss learning to live with unresolved grief*. Harvard University Press.
- Boss, P. (2006). *Loss, trauma, and resilience: Therapeutic work with ambiguous loss*. W.W: Norton & Co.
- Boss, P., (2010). The trauma and complicated grief of ambiguous loss. *Pastoral Psychology*, 59(2), 137–145. <https://doi.org/10.1007/s11089-009-0264-0>
- Bowen, M. (1978). *Family therapy in clinical practice*. Jason Aronson.
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3(2), 77–101. <https://doi.org/10.1191/1478088706qp063oa>
- Center for Substance Abuse Treatment. (2014). Understanding the impact of trauma. In *Trauma-informed care in behavioral health services* (Treatment Improvement Protocol No. 57). Substance Abuse and Mental Health Services Administration, U.S. Department of Health and Human Services.
- Doka, K. (1989). *Disenfranchised grief: Recognizing hidden sorrow*. Lexington Books.
- Erikson, E. (1980). *Identity and the life cycle*. W.W: Norton & Co.
- Etchison, M., & Kleist, D. (2000). Review of narrative therapy: Research and utility. *The Family Journal*, 8(1), 61–66. <https://doi.org/10.1177/1066480700081009>
- Evans, A., & Cocomma, P. (2014). *Trauma-informed care: How neuroscience influences practice*. Routledge/Taylor and Francis Group.
- Finkler, K. (2001). The kin in the gene—The medicalization of family and kinship in American society. *Current Anthropology*, 42(2), 235–263. <https://doi.org/10.1086/320004>
- Frankl, V. (1963). *Man’s search for meaning: An introduction to logotherapy* (rev. and enlarged. ed.). Pocket Books.
- Franz, D., Marsh, H., Chen, J., & Teo, A. (2019). Using Facebook for qualitative research: A brief primer. *Journal of Medical Internet Research*, 21(8), e13544–e13544. <https://doi.org/10.2196/13544>
- Freeman, R., Gwadz, M., Wilton, L., Collins, L., Dorsen, C., Hawkins, R., Silverman, E., Martinez, B., Leonard, N., Applegate, A., & Cluesman, S. (2020). Understanding long-term HIV survivorship among African American/Black and Latinx persons living with HIV in the United States: A qualitative exploration through the lens of symbolic violence. *International Journal for Equity in Health*, 19(1), 146–146. <https://doi.org/10.1186/s12939-020-01253-w>
- Frith, L., Blyth, E., Crawshaw, M., & Akker, O. (2018). Secrets and disclosure in donor conception. *Sociology of Health & Illness*, 40(1), 188–203. <https://doi.org/10.1111/1467-9566.12633>
- Gilding, M. (2005). Rampant misattributed paternity: The creation of an urban myth. *People and Place (Clayton)*, 13(2), 1–11.
- Gill, J., Obley, A., & Prasad, V. (2018). Direct-to-consumer genetic testing: The implications of the US FDA’s first marketing authorization for BRCA mutation testing. *JAMA*, 319(23), 2377–2378. <https://doi.org/10.1001/jama.2018.5330>
- Gillies, J., & Neimeyer, R. (2006). Loss, grief, and the search for significance: Toward a model of meaning reconstruction in bereavement. *Journal of Constructivist Psychology*, 19(1), 31–65. <https://doi.org/10.1080/10720530500311182>
- Gould, W., & Heine, S. (2012). Implicit essentialism: Genetic concepts are implicitly associated with fate concepts. *PloS One*, 7(6), e38176–e38176. <https://doi.org/10.1371/journal.pone.0038176>
- Greeff, J., & Erasmus, J. (2015). Three hundred years of low non-paternity in a human population. *Heredity*, 115(5), 396–404. <https://doi.org/10.1038/hdy.2015.36>

- Hall, J., & Powell, J. (2011). Understanding the person through narrative. *Nursing Research and Practice*, 2011, 293837. <https://doi.org/10.1155/2011/293837>
- Hercher, L., & Jamal, L. (2016). An old problem in a new age: Revisiting the clinical dilemma of misattributed paternity. *Applied & Translational Genomics*, 8, 36–39. <https://doi.org/10.1016/j.atg.2016.01.004>
- Herman, J. (1992). *Trauma and recovery*. Basic Books.
- Institute of Medicine. (1994). *Assessing genetic risks: Implications for health and social policy*. National Academy Press.
- Karnilowicz, W. (2011). Identity and psychological ownership in chronic illness and disease state: Identity and ownership. *European Journal of Cancer Care*, 20(2), 276–282. <https://doi.org/10.1111/j.1365-2354.2010.01220.x>
- Kirkpatrick, B., & Rashkin, M. (2017). Ancestry testing and the practice of genetic counseling. *Journal of Genetic Counseling*, 26(1), 6–20. <https://doi.org/10.1007/s10897-016-0014-2>
- Kroger, J. (2002). Introduction: Identity development through adulthood. *Identity*, 2(1), 1–5. https://doi.org/10.1207/S1532706XID0201_01
- Larmuseau, M. (2018). Growth of ancestry DNA testing risks huge increase in paternity issues. *Nature Human Behaviour*, 3(1), 5–5. <https://doi.org/10.1038/s41562-018-0499-9>
- Lowe, G., Pugh, J., Kahane, G., Corben, L., Lewis, S., Delatycki, M., & Savulescu, J. (2017). How should we deal with misattributed paternity? A survey of lay public attitudes. *AJOB Empirical Bioethics*, 8(4), 234–242. <https://doi.org/10.1080/23294515.2017.1378751>
- Mahon, S. (2018). Why pretesting counseling is critical in the age of consumer genetic tests. *Cancer Genetics*, 33(9), 45–46.
- Marcia, J. (1980). Identity in adolescence. In J. Adelson (Ed.), *Handbook of adolescent psychology* (pp. 159–165). John Wiley & Sons.
- Marcia, J. (1993). *Ego identity: A handbook for psychosocial research*. Springer-Verlag.
- Marcia, J. (2002). Identity and psychosocial development in adulthood. *Identity*, 2(1), 7–28. https://doi.org/10.1207/S1532706XID0201_02
- Middleton, A., Mendes, A., Benjamin, C., & Howard, H. (2017). Direct-to-consumer genetic testing: Where and how does genetic counseling fit? *Personalized Medicine*, 14(3), 249–257. <https://doi.org/10.2217/pme-2017-0001>
- President's Commission for the Study of Ethical Problems in Biomedical and Behavioral Research. (1982). *U.S. Government Printing Office*. <https://pubmed.ncbi.nlm.nih.gov/12041401/>
- Roberts, B., Helson, R., & Klohnen, E. (2002). Personality development and growth in women across 30 years: Three perspectives. *Journal of Personality*, 70(1), 79–102. <https://doi.org/10.1111/1467-6494.00179>
- Roberts, J., & Ostergren, J. (2013). Direct-to-consumer genetic testing and personal genomics services: A review of recent empirical studies. *Current Genetic Medicine Reports*, 1(3), 182–200. <https://doi.org/10.1007/s40142-013-0018-2>
- Scabini, E., & Manzi, C. (2011). Family processes and identity. In S. J. Schwartz, K. Luyckx, & V. L. Vignoles (Eds.), *Handbook of identity theory and research* (pp. 565–584). Springer. https://doi.org/10.1007/978-1-4419-7988-9_23
- Schwartz, A. (2020). *The post-traumatic growth guidebook: Practical mind-body tools to heal trauma, foster resilience and awaken your potential*. PESI Publishing & Media.
- Solomon, J. (2004). Modes of thought and meaning making: The aftermath of trauma. *The Journal of Humanistic Psychology*, 44(3), 299–319. <https://doi.org/10.1177/0022167804266096>
- Strong, C., Martin, B., Jin, H., Greer, D., & O'Connor, P. (2019). Why do consumers research their ancestry? Do self-uncertainty and the need for closure influence consumer's involvement in ancestral products? *Journal of Business Research*, 99, 332–337. <https://doi.org/10.1016/j.jbusres.2018.12.065>
- Thomas, P. A., Liu, H., & Umberson, D. (2017). Family relationships and well being. *Innovation in Aging*, 1(3), igx025–igx025. <https://doi.org/10.1093/geroni/igx025>
- Thrush, S., & McCaffrey, R. (2010). Direct-to-consumer genetic testing: What the nurse practitioner should know. *Journal for Nurse Practitioners*, 6(4), 269–273. <https://doi.org/10.1016/j.nurpra.2009.10.004>
- Turney, L. (2005). The incidental discovery of nonpaternity through genetic carrier screening: An exploration of lay attitudes. *Qualitative Health Research*, 15(5), 620–634. <https://doi.org/10.1177/1049732304273880>

How to cite this article: Grethel, M., Lewis, J., Freeman, R., & Stone, C. (2022). Discovery of unexpected paternity after direct-to-consumer DNA testing and its impact on identity. *Family Relations*, 1–17. <https://doi.org/10.1111/fare.12752>