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“I Expect It as Part of the Kind of Package Deal When You Sign Up to These Things”—Motivations and Experiences of Ghosting

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Most online dating users perceive ghosting to be common and expect that there is a chance of being ghosted on online dating platforms (ODPs). The current study extends previous research by gaining qualitative insight into what people believe constitutes ghosting behavior, why people ghost, and how ghosting makes them feel. This study aimed to (a) explore individuals' motivations to ghost, (b) explore individuals' experiences of ghosting, and (c) gather the ghosters' views of ghosting definition. A total of 12 online interviews were conducted. All participants had previously ghosted on ODPs and lived in the United Kingdom. Data were analyzed using reflexive thematic analysis. The presented five themes reflect a contextual realist approach, using both semantic and latent coding, and reveal that ghosting is considered the norm on ODP. There are general and specific motivations underpinning ghosting behavior, producing a mixed emotional response from the ghoster. The findings also shed light on how we can better define ghosting, with participants having concerns with the word relationship. Finally, we highlight several protective factors that can minimize the likelihood of ghosting. Based on our findings we suggest that ghosting be defined as being a gradual or sudden one-sided ceasing of communication to end the progress of an interaction with another person. While we found several protective factors that can minimize the likelihood of ghosting, these are unique to the individual and ghosting cannot be abolished as it has become a normative and embedded practice within ODP.

Public Policy Relevance Statement

A study on online dating reveals a new ghosting definition identifies protective factors of ghosting; however, ghosting is the norm and remains a part of the digital dating culture. Participants share their experiences and motivations, shedding light on this ghosting behavior.

Keywords: ghosting, online dating, ghosting motivations, ghosting experiences

Supplemental materials: <https://doi.org/10.1037/ppm0000504.supp>

Ghosting can be defined as ceasing communication to the person you are speaking to without an explanation, and differs from other relationship dissolution strategies due to the lack of explicit explanation as to


why the relationship was terminated (Navarro et al., 2021a). The manner in which people ghost can differ. LeFebvre et al. (2019) introduced ghosting as a form of relationship dissolution strategy and identified

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Additional online materials are available at <https://osf.io/w74p3>.

Nikki Dean Marshall served as lead for conceptualization, methodology, project administration, supervision, and writing—original draft, contributed equally to visualization, and served in a supporting role for resources. Abigail O'Shea contributed equally to writing—original draft and served in a supporting role for writing—review and editing. Parvathi Sajiv Kumar served in a supporting role for writing—review and editing and reading up-to-date literature. Benjamin John Partridge contributed equally to writing—review and editing and served in a supporting role for formal analysis, supervision, and writing—original draft. Nikki Dean Marshall and Abigail O'Shea contributed equally to formal analysis.

Rohima Akhtar, Tegan Abbs, and Elizabeth Fogarty contributed equally to resources and investigation.

 The experimental materials are available at <https://osf.io/w74p3>.

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four categories of ghosting behavior: sudden and short-term, gradual and short-term, sudden and long-term, and gradual and long-term. In short-term ghosting, there is the possibility of reigniting the conversation, whereas, in long-term ghosting, it is permanent and there is no possibility of reconciliation. In sudden ghosting, the ghoster stops communication with no indication beforehand, in contrast, gradual ghosting is where the ghoster deescalates the communication by taking longer to reply and appears more distant before ending all communication. Furthermore, ghosting can include unmatching on online dating platforms (ODPs), blocking, or ignoring the person, and can occur at any point in a relationship, from the online talking stage to offline interactions (LeFebvre et al., (2019)). However, some researchers make a distinction between ghosting and blocking, defining them as different types of behavior (e.g., De Wiele & Campbell, 2019), while others consider blocking and ghosting as a similar type of rejection (e.g., Kay & Courtice, 2022; Koessler et al., 2019). Kay and Courtice (2022) conducted a thematic analysis and found that ghosting was considered a method of ending an interpersonal relationship, while blocking and deleting someone were similar but distinct behaviors associated with ghosting by utilizing technology. Blocking was used as a tool where the ghosted people were blocked from sending further messages, and it was done to avoid further communication through technology. The categories highlighted by LeFebvre et al. (2019), and the difference in whether blocking is seen as a form of ghosting or not, can contribute to a difficulty in defining ghosting, as individuals may experience it differently, and definitions used in research may not be truly capturing what an individual constitutes as ghosting behavior.

Most users perceive ghosting as common on ODP and expect that there is a chance of being ghosted when using them (e.g., De Wiele & Campbell, 2019; Timmermans et al., 2021; Thomas & Dubar, 2021). Research shows that ghosting is not a rare behavior, one study has specifically pointed out the correlation between the rise in ghosting and the increased use of dating platforms (LeFebvre et al., 2019). While Timmermans et al. (2021) found that 85% of their sample had been ghosted, Freedman et al. (2022) and Navarro et al. (2021b) reported much lower rates with 26.1% and 19.3%, respectively, and Powell et al. (2021) found that between 28.5% and 47% of participants had been ghosted. This research as a whole demonstrates that while there is some inconsistency in ghosting prevalence, it is not a rare behavior experienced by users and appears to be becoming a normative practice on ODP.

Research attempting to understand ghosting motivations have found a range of reasons why individuals ghost online such as that they became disinterested in the ghostee, saw undesirable qualities in them, did not see the relationship as being serious, and ultimately, that it was an easier option compared to the alternative of confronting the ghostee (e.g., Freedman et al., 2019; Manning et al., 2019; Navarro et al., 2021a). Qualitative research has found that some users of ODP find it easier to ghost people they are speaking to than to directly reject them (e.g., De Wiele & Campbell, 2019; Timmermans et al., 2021). Ghosting avoids potential uncomfortable discussion and conflicts which may occur with more direct dissolution strategies (Koessler et al., 2019). People often feel discomfort when having to reject unwanted suitors (Bohns & DeVincent, 2019) and ghosting provides a solution where this rejection can be avoided. Ghosting is facilitated on ODP partly because of the relative anonymity, but also the ease of disappearing at a click of a button afforded by technological communication and the apps themselves (e.g., Freedman et al., 2019; LeFebvre, 2017; Timmermans et al., 2021), as there is no obligation to continue communication.

Current Study

Methodologically, current studies examining ghosting have generally employed questionnaires (e.g., LeFebvre et al., 2019; Powell et al., 2021; Timmermans et al., 2021) which have the strength of allowing for large sample sizes and generalizability. However, this method does not allow for in-depth understanding of ghosting; thus, semistructured interviews were chosen to allow for flexibility to probe beyond the interview schedule questions in order to understand why individuals ghost and the definition of ghosting at a deeper level, particularly as ghosting behavior may encompass different elements to it. This method also allows for flexibility and the cocreation of data between the interviewer and the participant. The current study aims to (a) explore individuals' motivations to ghost on ODP, (b) explore individuals' experiences of ghosting someone, and (c) gather the ghosters views of ghosting definition.

The current study thus extends previous research by exploring what people believe constitutes ghosting behavior, the reasons why people ghost, and how ghosting makes the ghosters feel. It is not well understood how the ghoster feels after ghosting, therefore this study not only explores the motivations of ghosting but also the feelings after the behavior has been done. Furthermore, a clear definition is important when studying a construct, and it is evident from previous research that there is some lack of consistency in defining what constitutes ghosting behavior.

Methodology

The study took both an inductive and deductive approach (one coder knowing the literature and the other not) to explore motivations and experiences of ghosting behavior. The two analyzers approached the data from different epistemological stances, ranging from socially constructionist to realist ideas. As a result, the presented results sit between these two poles and reflect a contextual realist approach to analysis, using both latent (Themes 2–4) and semantic (Themes 1 and 5) themes. To maintain reflexivity, a third researcher who takes a critical realist approach was introduced to enable triangulation of ideas and attenuate any biases in perception of the two coders. Coders reflected on their coding throughout the analysis process, prompting discussion of any preconceived ideas or personal interpretations. A Consolidated criteria for REporting Qualitative research (Tong et al., 2007) has been completed (see the additional online materials at <https://osf.io/w74p3>).

Participants

A total of 12 participants aged between 18 and 40 ($M = 24$ years, $SD = 6.17$) took part in the research (eight identified as female, three identified as male, and one identified as nonbinary). The inclusion criteria required participants to: be over the age of 18 years old and have previously ghosted on ODP. Table 1 provides the demographics for each participant and their associated pseudonym.

Participants were recruited through the SONA system which allows undergraduate Psychology students at the University of Sheffield to obtain course credits for their participation, and opportunity sampling through the researcher's social media platforms.

Procedure

Participants read the information sheet and consent form via Qualtrics (Version November 2020–December 2021, Qualtrics, Provo, Utah, United States) where they gave consent, demographic information

Table 1
Participant Demographics and Pseudonyms

Pseudonym	Age	Gender	Sexuality	Education	Employment	Nationality	Relationship status
Becca	22	Female	Heterosexual	Undergraduate degree or equivalent	FT student, PT work	British	Single
Rox	34	Female	Bisexual	Masters or equivalent	Unemployed	British	Single
Gaby	18	Female	Queer	A level or equivalent	FT student	British	Single
Sam	20	Female	Bisexual	A level or equivalent	FT student, PT work	British	Relationship
Anna	24	Female	Heterosexual	Masters or equivalent	FT work	Polish	Single
Emily	40	Female	Heterosexual	Masters or equivalent	FT work, PT student	British	Single
Monica	25	Female	Bisexual	Masters or equivalent	FT Student, PT work	British	Single
Leah	20	Female	Heterosexual	A level or equivalent	FT student	British	Relationship
Ben	25	Male	Heterosexual	Undergraduate degree or equivalent	PT work, PT student	British	Single
Roy	21	Male	Bisexual	Undergraduate degree or equivalent	FT work	British	Single
Alex	24	Male	Bisexual	A level or equivalent	FT student	British	Single
Kate	21	Nonbinary	Bisexual	A level or equivalent	Unemployed	Romanian	Relationship

Note. Gender and sexuality were self-identified. All participants except two had been ghosted before on ODP. PT = part time; FT = full time; ODP = online dating platform.

was collected, and generated their unique code to allow for the interview and demographics to be matched. Interviews were conducted online over the Google Meet platform and were audio recorded. Participants were given 1 week to withdraw from the study. The average interview length was 30 min 34 s (minimum 17 min, maximum 55 min).

Analytic Procedure

A semistructured interview was designed and split into three sections (see the additional online materials at <https://osf.io/w74p3>). The first section gained a general idea of the participants previous experience of dating (e.g., Can you tell me about your experiences of online dating?). The second section explored the definition of ghosting, the motivations, and why participants chose this particular strategy to end interaction (e.g., Can you tell me about a time when you have ghosted someone?). The third section generally aimed to explore participants' feelings after ghosting, intentions to ghost again, and their experiences of being confronted after ghosting (e.g., Can you describe how likely you think it is that you would ghost someone again?).

The interviews were transcribed using Jeffersonian transcription conventions (Jefferson, 2004), and the extracts were analyzed using reflexive thematic analysis (Braun & Clarke, 2019). Two authors coded the data, and after every two interviews they came together to sense-check and explore interpretations of the data. These online meetings were collaborative and aimed to achieve a richer understanding of the interpretation meanings through discussing the analytic process (Byrne, 2022).

Ethics

Ethical approval was obtained from the University of Sheffield's Psychology Department (Reference: 03724).

Analysis

Theme 1—"I Expect It as Part of the Kind of Package Deal When You Sign Up to These Things": Navigating Ghosting Ideology and Online Dating Culture

This theme explores the normalization of ghosting and how it has become an embedded behavior on ODP.

Online dating users generally match with people they do not know, and therefore are not able to predict how someone behaves.

While this forms part of the "*parcel of meeting someone online like you just don't know how it will go*" (Monica), there does appear to be an exception to this uncertainty in the form of ghosting behavior. In the world of online dating, ghosting is a normative practice, and participants such as Monica describe it as "*part of the kind of package deal when you sign up to these things*." All participants had ghosted previously, and most had also experienced being ghosted too, except two individuals who had never been ghosted themselves, thus, while not all users will experience ghosting, it is more likely to experience being ghosted as it is "*now such a big part of like our sort of the whole gen*" (Gaby).

There is a level of normalization of this behavior echoed by participants "*like it's so normalized in online dating that like if it happens or if you do it you think well this is like a thing now so it, people get it*" (Monica). Monica describes how people understand that this behavior may happen, which suggests that there is a culturally and socially shared understanding and acceptance of this behavior on these platforms. Indeed, ghosting has become so normalized and accepted that Kate explains that she does not "*keep track of how many times I did it or how many times other, other people, do it to me. It just doesn't cross my mind*." This demonstrates how ghosting is a normative and embedded behavior. However, ghosting can still be problematic and can "*affect [a person's] self-esteem, their confidence, erm their mental health*" (Kate). Ghosting can have detrimental effects and Kate advises online dating users to "*just go out, take it easy, don't think about it. Dating apps are not that horrible if you know how to deal with them*." Kate's advice suggests that when you are aware of these embedded behaviors in ODP such as ghosting, you may then interpret the behavior as less serious which in turn may reduce the negative effects associated with being ghosted.

ODP allows individuals to talk to multiple people at the same time, and there is an understanding among users that "*they might be talking to you, but they might be talking to 30 different people*" (Kate). Talking to multiple people allows users to navigate the pool of people and meet their needs more quickly; however, it also can also facilitate ghosting behavior because "*you're not going to be that intense with them that quickly it's completely fine to just cut contact*" (Becca), so ghosting is acceptable and normalized when the relationship between the ghostee and ghoster is underdeveloped.

Ghosting would be challenging to do face-to-face as this behavior is not consistent with daily interpersonal etiquette and social rules and would require you to stop talking to someone and walk away

or even ignoring someone, which would be considered rude by many. However, while a few participants disclosed ghosting as being “*quite rude to be honest with you*” (Ben) which would be consistent with how face-to-face interactions would be interpreted, there is a contradiction between attitudes and behavior. All participants stated that they were likely to ghost again, so it may be that the online nature of these platforms facilitates ghosting as the “*hardness feels more easily acceptable because it’s online*” (Emily). The online aspect removes or diminishes some of the typical social rules and etiquette which allows for ghosting behavior to occur. Ghosting provides an easy option for individuals to stop communication with another person. Overall, the removal of typical social rules allows ghosters to have less personal responsibility to treat users in a particular way, and participants justify the behavior as a normalized part of online dating.

Theme 2—“I Hate to Say It but Some People It Does Feel Like That’s the Only Option You Have”: Motivations for Ghosting

This theme outlines the numerous reasons participants gave for ghosting behavior and distinguishes reasons for ghosting which are specific to an individual (e.g., mismatching in motivations) versus more general reasons for ghosting (e.g., ease).

Many specific reasons for ghosting related to aspects about the conversations being had with the ghostee. For example, dull conversations were a common reason participants provided for ghosting. Kate stated “*I hate dull conversations. If somebody’s boring ... if they’re telling you like ‘I’m just eating pasta right now’, I’m just like ‘I didn’t ask’ tell me something fun I don’t care about what you’re eating. And when stuff like that happens there are plenty more fish in the sea.*” This was echoed by Ben, who commented “*the conversation would be so dry and boring I was like ‘what’s the point?’ so I stopped replying.*” Dull conversations were also framed in the context of lacking excitement, for example: “*I know what you did with your week cause you told me, now we’re meeting up to do something an activity which is nice but there’s nothing new to add, there’s nothing exciting*” (Monica). Consistent with this, several participants commented on a lack of spark as a motivation to ghost someone: “*if there’s no spark I think that’s the most important thing. If you’re not feeling something like initial that’s really good then I don’t think it’s gonna develop*” (Becca). This suggests that the level of excitement and engagement someone gages from conversations can play a key role in ghosting behavior, and ghosting becomes a consequence of these needs not being met.

Several participants commented that a key motivation to ghost was finding communication from the ghostee too “*intense*” (Becca) or “*pushy*” (Leah). Some participants described this experience as stressful, indicating that such conversations can cause a level of stress. For example, Becca stated: “*[It] gets a bit stressful when they [are] all like, when can I see you? when can we go out for drinks and stuff?*” (Becca). Other participants described being bombarded by contact from the ghostee: “*He seemed to want more and I just wasn’t as interested... it was just constant it just kept coming up with loads of calls and messages, if somebody doesn’t respond to your call or message if you then message again, you’re not picking up on some hints there*” (Rox). Here, participants engage in ghosting behavior as a result of the intensity of the ghostee. Intensity and too much contact from an individual can increase ghosting behavior. In

line with intense and unwanted communication, several participants also described their experiences of receiving inappropriate or sexual comments, which made them feel uncomfortable. For example, Emily commented that previous ghostees had “*tried to turn the conversation overtly sexual.*” She later stated that she felt they were trying to “*coerce*” her: “*Even though I’d said ‘oh no I’m not up for that and that’s not where I’m going’ they were trying to coerce me or convince me so it was like yeah block no thanks*” (Emily). These experiences of ghostees being sex-oriented were also echoed by Leah, who stated: “*in my experience a lot of them do just want sex or something like that.*” For the participants above, ghosting may seem an easy way out of an interaction which is inducing stress or feeling too intense and intrusive. It may also be a possible ‘escape function’ for the ghoster, helping them remove themselves from uncomfortable situations or situations that may quickly escalate and become uncomfortable.

Another specific reason provided for ghosting was a perceived mismatch in the ghoster and ghostees motivations and/or in personal opinions. An example of mismatch in motivation was provided by Ben: “*I’m very direct about what I want for example, if someone wants something very serious like get into a serious relationship, settling down to buy a house and I don’t, then that may be a reason for me to ghost someone.*” Consistent with the idea of a mismatch in motivations driving ghosting behavior, a mismatch in opinion was provided as a reason for ghosting. Gaby stated “*we were very different politically wise... I was on one side, he was on the other side.*” In particular, one participant discussed finding these differences especially difficult if the ghostee had misogynistic views: “*He had like this perfect idea of what a woman should be and I was like, first of all I’m not a woman, second of all no thank you and I just like, I deleted him on Tinder.*” Kate also went on to explain that racist opinions also motivated ghosting behavior: “*I don’t mind people who have different opinions on like certain things but if like a person is racist you know what, you do you, go live your life, I don’t care, just let me be my free little self, I don’t want to bother with you*” (Kate). In the mismatched scenarios above, there is the potential for conflict and ghosting here could be seen as another form of an “*escape function*,” where the ghoster has the ability to shut down a conversation before any conflict may occur as a result of these mismatched opinions or views. Ghosting here could be seen as a protective function, protecting the ghoster from potential conflict. Furthermore, disparate views or opinions may lead the ghoster to immediately evaluate any future relationship as unviable which may provide further justification to the ghosting behavior such as in the case of Ben above.

Ghosting was not just motivated by specific reasons relating to the individual, there were also more general reasons why users ghost. For instance, Monica explains that with ghosting there is an element of “*convenience of it*” and Alex that “*it’s so easy to do.*” Ghosting provides an easy “*out*” option for individuals to take with potentially little to no consequence. The online nature of the interaction means that once the individual is ghosted and blocked there may be little to no repercussion for the ghoster. While, for some, ghosting may be a convenience, others could not see another way to end contact with the person, and ghosting felt like the last resort to terminate contact. For example, Sam stated “*I hate to say it but some people it does feel like that’s the only option you have.*” Furthermore, many participants conveyed lacking a sense of duty to the people they had ghosted, which was perpetuated by the fact they had not formed a real relationship with them, and felt they did not owe that person an explanation for not wanting to continue talking to them: “*I suppose you don’t really know them that*

well and you don't owe them anything" (Leah). This idea of not owing the person an explanation was particularly prevalent among participants who had not met their ghostees face-to-face, because *"then it becomes personal"* (Emily). Some users also believed that they did not owe the person their time in providing an explanation for ghosting, particularly if they had taken offense to something the ghostee had previously said to them: *"I was like do you know I don't owe you my time anymore"* (Gaby). Ghosting allows users to prioritize themselves, and in Gaby's case where they had taken offense, it provided her with an escape route for future interactions and being exposed to more potential offensive material. One participant explained that ghosting does not *"require any malice it doesn't require anything at all it just you just forget to reply"* (Alex), suggesting there is no desire to harm someone by ghosting them, but rather there is an indifference to the behavior which may be due to absent-mindedness. Ghosting here is characterized as being both an active or passive process, there may be a motivation to intentionally ghost, for example in an attempt to escape an interaction or as a protective feature or ghosting may occur as a lack of motivation to engage with the other person.

Theme 3—"You Can Just Cut That Person Out and You Don't Need to Worry About That Contact Anymore": The Lived Experience of Ghosting Someone

While ghosting has been described above as a behavior which has little to no consequence attached to it, there may still be a positive resultant feeling or an emotional burden attached to it. This theme outlines interviewee's emotional responses to the experience of ghosting someone. Responses were fairly mixed, including negatively connoted emotions of feeling bad and guilty. However, others expressed feeling relieved or even good after ghosting.

Although several participants stated *"I felt bad,"* this typically preceded a *"but"* suggesting that *"feeling bad"* was a disclaimer before revealing something they felt could be judged or was socially unacceptable: *"I felt a bit bad ... I guess it's rude ... But similarly, I felt like he was being rude in just being a bit constant with the messaging and stuff like that"* (Rox). This was echoed by Monica: *"I did feel a bit bad but another part of me was like I think I'd feel worse just saying ... 'I know what you're going to tell me now and it's boring.'"* Participants attempt to provide a justification when describing their ghosting behaviors, as they may deem ghosting a *"bad"* thing to do to someone. While this may be the case, Monica's description provides a contrast, in which the ghosting behavior is deemed the better of two potential outcomes. For these participants, the ghosting behavior was framed as the lesser of two evils or as a justifiable and ultimately not negative behavior.

However, some participants appeared to express genuine feelings of guilt after ghosting. For example, Roy described he felt like he had *"just used someone."* Interestingly, Leah stated: *"I'd probably say...[I felt] guilty and feel a bit bad for the other person... and a bit like maybe I shouldn't have done it this way and maybe I should have done it a different way"* (Leah), suggesting that on reflection, the ghosting behavior may be one which is questioned and reevaluated. One participant even described feeling upset following ghosting: *"when we first met, we got along well and I considered him a friend somewhat ... cutting ties with him was a bit upsetting"* (Kate). Kate's extract above is interesting as she described the person she ghosted as *"somewhat of a friend."* This is different to many of the other ghosting relationships where participants describe ghosting after shorter-term interactions.

For Kate to describe the ghostee as constituting somewhat of a friend would indicate that they had a more well-developed relationship than in some of the other cases which may account for this feeling of upset. There may be a greater sense of duty to someone when there is a more well-developed relationship, making ghosting a less acceptable or less justifiable behavior.

Another participant expressed feeling self-doubt after ghosting: *"I think double questioning myself did I misunderstand that, did I misread things, maybe ... I'd done something that made him uncomfortable but maybe it was too soon"* (Emily). This was followed by doubting the use of online dating services altogether: *"I felt a bit hopeless in the service itself ... like oh god what's the point I'm never gonna meet anybody online this is just silly ... is this really the right thing to be doing ... so questioning the site because it was tinder and so it is prominently known for hookups"* (Emily)

However, several participants openly shared they felt a sense of relief following ghosting. Ben stated he felt *"kind of relieved in a way? Cause you can just cut that person out and you don't need to worry about that contact anymore."* Several other participants reiterated this by saying they felt relieved as they didn't have to *"deal with"* the individual any longer (Rox). For example, Gaby stated: *"I think on one hand, it made me feel quite relieved that I didn't have to continue a conversation that I wasn't really engaged in. I felt quite relaxed actually because it was like aw I don't need to pretend like I'm interested anymore"* (Gaby). The idea of not having to deal with an individual any longer feeling good was also expressed by others: *"if the conversation is unpleasant, it feels good to ghost someone 'cos you feel like you don't have to deal with them anymore"* (Sam). Overall, there is a distinct sense of ease in performing a ghosting behavior. This action can be performed to bring about an immediate relief and while some participants, on reflection, felt guilty for ghosting someone, for some it was a justifiable behavior, particularly in light of unwanted or unpleasant interactions online.

Theme 4—"If I've Actually Got to Know Someone Like I Know Things About Them, I Wouldn't Be That Rude": Protective Factors to Ghosting

This theme explores several potential protective factors associated with lower likelihood of being ghosted such as physical, personality, communicative, and interactive characteristics.

One physical characteristic that may reduce the likelihood of being ghosted is physical attractiveness, *"physical attraction does play a part as well like I'd be less likely to ghost someone if I was interested in them like physically"* (Sam). Most users upload pictures of themselves and photos can help individuals make a decision around if they want to match with someone, the suggestion here with Sam's quote is that ghosters may be more willing to engage and persevere if they are physically attracted to the person, and therefore this acts a protective factor to being ghosted. Furthermore, shared beliefs also act in a favorable manner, *"they way they express themselves, whether their way of thinking like fits mine in a way"* (Kate). Being *"on the same page"* as someone and having shared beliefs and values could be thought of as a precursor for a good relationship and therefore is a protective factor for ghosting.

Similarly, communicative characteristics like disclosing personal information can also act as a protective factor, *"I'd just met someone, I don't really know them that well, they don't know anything personal about me and vice versa then I would, yeah, I would happily"*

ghost someone. Whereas if I've actually got to know someone like I know things about them, I wouldn't be that rude" (Ben). Disclosing personal information breaks down barriers and breaks down the unknown. Sharing something personal changes the nature of the interaction, and suggests that when there has been an exchange of more personal information, it is less likely that ghosting behavior will occur. At this stage, it would be considered rude by Ben.

Getting to know someone can require time, and for some participants time was a contributing factor where ghosting was dependent on "how long I have been like speaking to them" (Gaby). The longer the interaction the less likely ghosting was to happen. If users had only "matched for like a day or two and then you just sort of like nah, I don't think it's that personal" (Anna), then it was not enough to get to know the person and ghosting is more likely to occur. Whereas if the interaction was longer "I would probably explain why because we have been talking for a while (.) but it comes down to how long we've been we've been speaking" (Gaby) so ghosting would be less likely to occur with Gaby instead opting to discuss the end of relationship rather than just ghost. Participants linked this to the idea proposed in Theme 2 about owing the person an explanation, investment of time appeared to indicate a reluctance to just ghost as "I feel like you owe them a little bit more of an explanation" (Gaby). However, time was not a protective factor for all participants, a few such as Alex explained that "I don't really care how long I've been talking to someone as long as as long as I'm enjoying it they're enjoying it like you know ... the conversations free flowing and natural that's important to me." For Alex, he was less likely to ghost as long as there was mutual enjoyment and the interaction was not stilted. Essentially for Alex time does not act as a protective factor, instead the more positive, enjoyable, and interactive the conversation is the less likely he is to ghost.

There are also actions that can reduce the chances of being ghosted such as those users who put in the effort to make plans to move the interaction offline into a physical space:

"if they make plans to like actually hang out like to like have a date on an ODP then I feel like I wouldn't ghost them cos I would rather see where it would go." (Sam)

Making plans and moving away from the online space shows a willingness to explore the interaction further and demonstrating that it will not be restricted only to the online world, thus it appears that moving the interaction offline demonstrates a willingness to develop the initial online interactions and explore the possibility of moving forward.

Ben also stated that "if I met someone, so online, if I only know them online then I'd ghost them, however if I'd met them in person then I wouldn't ghost them" (Ben) and Anna explained because "it becomes personal." Again this suggests that the nature of the relationship changes having met offline. There is no longer an anonymous person behind a phone, an offline meeting creates a more personal connection, the characteristic of which may not be the same online and this personalization acts as a protective factor for ghosting. While most participants did not ghost after meeting the person, a few did ghost after meeting their match "we've met up a few times and it was nice but not exciting or fun' and I was like I don't even (2) want to" (Monica). The reasons for ghosting echoed those found in Theme 2, and what we can see is despite meeting the person offline, this does not eliminate the chance of ghosting entirely.

While not all interactions may move offline straight away, some interactions may move to different online spaces. This may include

moving to a different platform. Sam speaks of ODP as if they have a conversation expiry date, "tinder doesn't last long but if it moves to another platform then there's less of a chance of being ghosted of like immediately." It is clear that Sam is not saying there is no chance of being ghosted, however, moving to a different platform does reduce the chance of being ghosted straight away without being given the opportunity to get to know one another. Leah explains that she tends to find it easier to talk to people on alternative platforms "I just tend to find it easier to talk to people on snapchat where I would be on that talking to my friends or like i'd talk to people easier on that I think," ODP may not be as familiar in comparison, and other social media sites such as Snapchat provide a convenient place to get to know one another as they may already be using it to talk to friends. Moving to a different platform does not mean that ghosting behavior will not occur, as demonstrated by Rox who did "swap numbers and he was Whatsapping me" but because the person was "being too intense," Rox decided to ghost. While many of these characteristics or actions may not eliminate the change of ghosting behavior entirely, they may reduce the likelihood in some cases.

Fundamentally ghosting is a normalized behavior and a part of everyday online dating; however, there are particular actions and characteristics that, while they may not eradicate the chances of ghosting or being ghosted, may act to reduce the likelihood of either performing or being the recipient of such behavior.

Theme 5—"Ghosting's More Like You Just Ignore Something, Completely Disappear": Personal Understanding of Ghosting and the Challenges of Defining It

This theme deconstructs a definition of ghosting being a one-sided ceasing of communication to end the progress of a relationship. The definition is explored through the individual's lens and their personal understanding of ghosting behavior.

Generally, participants defined ghosting in a way which is consistent with the definition provided above. Participants agreed that ghosting is an intentional action to stop communication, Kate describes it as a "deliberate tactic that your doing to either, erm just like hide it, try to you know push the person out of your life because they're being weird and they make you feel uncomfortable or just no interest." It is a decision that has been made by the ghoster, thus because it is not mutual "the other person might not expect it" (Leah). The use of the word deliberate is interesting as it suggests that this decision was made with awareness of their action and with intent. The reasons for ghosting vary but something that is constant is that the ghoster, by definition, takes control of the interaction.

Some participants found it important to make a distinction between ghosting and other forms of interactive cessation which would not be regarded as ghosting. There are times interactions may stop for other reasons such as "fizzling out or like a slow drop of communication are a bit different" (Monica) or interactions "just come to its natural end" (Alex). The action of ghosting does not include when there is nothing left to contribute to the conversation from either side, and conversation flow has mutually come to an end. Thus, the distinction would suggest that with ghosting the conversation flow has not come to a natural end and there is still potential conversation to occur, but the ghoster makes the decision to stop the communication flow.

The method in which people ghost varies. Some ghostees receive a sudden stop of communication, whereas others intentionally make

less and less communication and take a more gradual approach to phasing out “*just gradually I put less erm interactive replies to someone so they so the conversation couldn’t really progress anymore*” (Gaby). Anna demonstrates this fluidity: “*yeah stopping the communication, stopping answering or just giving, ah another one, just giving just one word very uninterested answers*” (Anna). The definition does not specify between the two, but as Gaby states “*I ghosted them for a reason you know, I chose to do this,*” both gradual and sudden ghosting encompass a conscious decision made by the ghoster to stop communication and the ghosters holds the power within the communicative relationship. However, it is not clear why some individuals choose to use a sudden approach, and others a more gradual one, it may come down to what participants constitute as ghosting behavior. For instance, for Ben “*ghosting’s more like you just ignore something, completely disappear*” and Becca “*I would cutting all contact or not replying to their messages with no explanation*” it is clear they engaged in a sudden form of ghosting. Both sudden and gradual ghosting approaches share the common notion of the ghoster being an active decision maker in stopping the communication moving forward. Ultimately why individuals choose to adopt sudden or more gradual approaches may be simply explained by individual preference.

It was also highlighted that while participants agreed with the beginning of the definition, some participants had concerns specifically with the word relationship in the definition. Alex explains how the word carries semantic connotations particularly when put in a dating environment:

“I think a relationship is a strong word to use I mean I know it’s technically true but like it is a form of a relationship when you’re looking at it on the context of you’re on a dating website the word relationship carries weight doesn’t it ... at least to me it does so I would say maybe maybe potential relationship as opposed to relationship otherwise it’s correct.”

Dictionary definitions of the word relationship range from interactions to close romantic friendship between individuals, the word has strong semantic connotations with romance, and it may be that accepting that a relationship was formed with a ghostee would make the action of ghosting less acceptable. One challenge that Rox encountered was how to define the word relationship, “*all depends on when you define a relationship as starting like if it’s when you’re meeting up or if you’re emotionally involved before meeting up or something like that.*” Rox goes further by explaining that there needs to be an emotional involvement and investment for a relationship to be established. Though, the reader should note that not all participants disagreed with the word relationship, some participants explain that “*relationships are anything not necessarily romantic relationships*” (Kate).

Finally, ghosting and blocking were not considered the same action by all participants, some participants such as Rox saw blocking as a form of ghosting “*the guy I met up with and then blocked I would very much consider that ghosting,*” blocking provided the security that stopped further communication for Rox. Analogously, Becca saw blocking as an extra step, where she had already ghosted someone, but they were not “*not taking the hint and I’ve ignored all that messages for say, two weeks and they’re still messaging say every day, then I’ll just block them because they’ve not understood.*” For some participants like Becca, blocking provided the finality for the resolution that ghosting should have but could not provide. Thus, where individuals have ghosted (i.e., not replied to messages)

and it has not been successful, blocking is an additional technological tool that can be used to successfully achieve their ghosting intentions. However, the definition does not make a distinction between these two words; however, it is interesting to see that not all participants interpreted ghosting as being the same thing.

Discussion

This research has revealed there are both general and specific motivations underpinning ghosting behavior which produce a mixed emotional response from the ghoster. This research serendipitously highlighted several key protective factors that can minimize the likelihood of ghosting, however, importantly these are unique to the individual. Finally, our findings have also shed light on how we can better define ghosting, and highlighted it is considered the norm on ODP, which is consistent with previous findings (e.g., Timmermans et al., 2021).

Our findings would suggest that most individuals agree with the definition that ghosting is where you cease communication with another person and, consistent with LeFebvre (2019) categories of ghosting behavior, our participants identified that ghosting can be sudden or gradual. Our participants identified that there is no possibility on their side of reigniting the conversation once they have ghosted, which is consistent with LeFebvre (2019) long-term ghosting category that sees ghosting as a final action. Ghosters do hold different opinions on what constitutes ghosting behavior which is consistent with previous findings (e.g., Timmermans et al., 2021). Ghosting may involve ceasing to interact with someone online without blocking them. While some individuals did not believe it was necessary to block someone to ghost them, others believed that blocking is a form of ghosting and thought of the action of blocking to be more final. For some individuals, their understanding and perceptions of ghosting may be impacted by what dating platforms they are using, for instance, while Tinder do not discuss ghosting, they do make a distinction between unmatched and blocking stating that unmatched someone cannot be reversed, whereas blocking can be reversed (Tinder, n.d.a, n.d.b). Thus, using the Tinder guidelines, the subtlety is in the finality of the action, with one being able to be reversed and the other not.

Fundamentally while ghosting may be a shared experience, what constitutes ghosting behavior differs and individuals have their own understanding and interpretation of ghosting. The findings also highlighted that the word relationship as a problematic word because of the semantic connotations, this shows the power language can have as one word can affect how a construct is interpreted. Many authors do use the word relationship in their definitions of ghosting (e.g., LeFebvre et al., 2017; Kay & Courtice, 2022; Koessler et al., 2019; Pancani et al., 2021) which is consistent with their findings in how individuals understand this construct. For instance, Koessler et al. (2019) recommend that ghosting be defined as “*a strategy used to end a relationship with a partner with whom romantic interest once existed whereby the disengager unilaterally ceases technologically mediated communication with the recipient (suddenly or gradually) in lieu of providing a verbal explanation of disinterest*” (p. 3). However, through our research we would encourage caution with words that are ambiguous to multiple meanings such as the word relationship which has semantic connotations with a romantic connection and look to replace it with a more neutral word(s). We, therefore, suggest that ghosting be defined as a gradual or sudden one-sided ceasing of communication to end the progress of an interaction with another

person. Nevertheless, exploring individuals' semantic understanding could be a good avenue for future research, because as Koessler et al. (2019) eloquently point out, we must be able to successfully define ghosting and describe what it entails to be able to research it well.

Our findings also highlighted specific motivations related to the individual such as finding the person boring, conversation fizzling out, and having a mismatch in opinions or in longer-term goals, and more general motivations such as finding ghosting easy and convenient in an online environment. These findings are consistent with previous findings that becoming disinterested in the ghostee, not seeing a relationship as being serious, and finding the behavior the easier option led to ghosting behaviors (e.g., Freedman et al., 2019; Navarro et al., 2021a). Our findings are also consistent with the qualitative research which has found that some online dating users find it easier to ghost people they are speaking to than to directly reject them (e.g., De Wiele & Campbell, 2019; Timmermans et al., 2021) strengthening this as a reason why people ghost online.

According to our findings, some people ghosted because they experienced a difference of opinion or mismatching views. In one example, a participant thought a user was racist and proceeded to ghost them which is consistent with Timmermans et al. (2021) findings of why individuals ghost, and also solidifies the idea that people ghost when they perceive undesirable qualities in an individual. Similarly, we also found that users ghosted because of misogynistic comments made by users which again highlights a difference of opinion or a mismatching view. Misogyny is not new on dating apps, research suggests that hostile interactions such as trolling and sexist messages are engendered by online dating apps (e.g., Ging & Siapera, 2018; Hess & Flores, 2018; Lee, 2019; Thompson, 2018).

We also found that ghosting behavior itself led to some feelings of genuine guilt for some participants. This is consistent with previous findings from Koessler et al. (2019), who found that ghosters reported feeling guilty about hurting the ghostee's feelings, with this influencing their overall decision to ghost. However, in our study, an expression of guilt seemed to be used to soften true feelings of relief or that the behavior was justifiable for some participants. In some cases, participants expressed upset at the ending of the relationship, highlighting that relationships formed online can lead to strong feelings developing which mirror those of a relationship formed in more traditional circumstances, or with more in-person contact. In sum, these findings echo those from Freedman et al. (2022) who found that ghosters were more likely to express guilt and relief.

One finding that stood out to us was that there were several protective factors that would reduce the likelihood of them ghosting the person. These protective factors relate to physical, personality, communicative, and interactive characteristics. For instance, we found that physical attractiveness acted as a protective factor in ghosting, which would align with Ranzini et al.'s (2022) findings who found that attractiveness is the most important factor in partner choice on a dating app but the discussion around protective factors on the whole was a novel contribution to this field of research. While these factors may not eradicate the chances of ghosting or being ghosted, they do reduce the likelihood of either performing or being the recipient of such behavior.

Our article explored the experiences of the ghoster; however, the majority of our participants had also been ghosted, with one participant directly linking that their experience of being ghosted influenced their ghosting behavior by being more likely to do it. We saw in the introduction that ghosting is not uncommon in ODP,

thus future research could look at individuals who have both been ghosted and have ghosted to enable triangulation of the ghosting experience. It would enhance the breadth of our knowledge on the overall ghosting experiences from differing perspectives and provide a holistic understanding of ghosting.

Concluding Remarks

We have demonstrated that while ghosting is a shared experience, people's personal understanding of what behaviors are classed as ghosting may be different to one another and this behavior may be more nuanced and complex than first imagined. We suggest based on our findings that ghosting be defined as a gradual or sudden, one-sided ceasing of communication to end the progress of an interaction with another person. Our findings suggest that there are several ghosting motivations, one of which may be to provide an escape function from unpleasant scenarios. As such, this can often provide the ghoster with feelings of relief, with occasional expressions of guilt to attenuate any fear of judgment from others. However, it is noted that, for some individuals, ghosting can be a difficult experience with genuine feelings of sadness. Finally, this research found that there are protective factors that can minimize the likelihood of ghosting, however, these are unique to the individual and ghosting cannot be abolished from this online environment as it is a normative and embedded practice within ODP.

References

- Bohns, V. K., & DeVincent, L. A. (2019). Rejecting unwanted romantic advances is more difficult than suitors realize. *Social Psychological and Personality Science*, 10(8), 1102–1110. <https://doi.org/10.1177/1948550618769880>
- Braun, V., & Clarke, V. (2019). Reflecting on reflexive thematic analysis. *Qualitative Research in Sport, Exercise and Health*, 11(4), 589–597. <https://doi.org/10.1080/2159676X.2019.1628806>
- Byrne, D. (2022). A worked example of Braun and Clarke's approach to reflexive thematic analysis. *Quality & Quantity*, 56(3), 1391–1412. <https://doi.org/10.1007/s11135-021-01182-y>
- Dean Marshall, N., Partridge, B., & O'Shea, A. (2023). "I expect it as part of the kind of package deal when you sign up to these things." *Motivations and experiences of ghosting* [Materials]. <https://osf.io/w74p3>
- De Wiele, C. V., & Campbell, J. F. (2019). From swiping to ghosting: conceptualizing rejection in mobile dating. In A. Hetsroni, & M. Tuncez (Eds.), *It happened on Tinder: Reflections and studies on internet-infused dating* (pp. 158–175). Institute of Network Cultures.
- Freedman, G., Powell, D. N., Le, B., & Williams, K. D. (2019). Ghosting and destiny: Implicit theories of relationships predict beliefs about ghosting. *Journal of Social and Personal Relationships*, 36(3), 905–924. <https://doi.org/10.1177/0265407517748791>
- Freedman, G., Powell, D. N., Le, B., & Williams, K. D. (2022). Emotional experiences of ghosting. *The Journal of Social Psychology*. Advance online publication. <https://doi.org/10.1080/00224545.2022.2081528>
- Ging, D., & Siapera, E. (2018). Special issue on online misogyny. *Feminist Media Studies*, 18(4), 515–524. <https://doi.org/10.1080/14680777.2018.1447345>
- Hess, A., & Flores, C. (2018). Simply more than swiping left: A critical analysis of toxic masculine performances on Tinder Nightmares. *New Media & Society*, 20(3), 1085–1102. <https://doi.org/10.1177/1461444816681540>
- Jefferson, G. (2004). Glossary of transcript symbols with an introduction. In G. H. Lerner (Ed.), *Conversation analysis* (pp. 13–31). John Benjamins.
- Kay, C., & Courtice, E. L. (2022). An empirical, accessible definition of "ghosting" as a relationship dissolution method. *Personal Relationships*, 29(2), 386–411. <https://doi.org/10.1111/per.12423>

- Koessler, R. B., Kohut, T., & Campbell, L. (2019). *Integration and expansion of qualitative analyses of relationship dissolution through ghosting*. PsyArXiv. <https://doi.org/10.31234/osf.io/3kvdx>
- Lee, J. (2019). Mediated superficiality and misogyny through cool on Tinder. *Social Media+ Society*, 5(3), Article 2056305119872949. <https://doi.org/10.1177/2056305119872949>
- LeFebvre, L. E. (2017). Ghosting as a relationship dissolution strategy in the technological age. In N. M. Punyanunt-Carter & J. S. Wrench (Eds.), *The impact of social media in modern romantic relationships* (pp. 219–235). Lexington Books.
- LeFebvre, L. E., Allen, M., Rasner, R. D., Garstad, S., Wilms, A., & Parrish, C. (2019). Ghosting in emerging adults' romantic relationships: The digital dissolution disappearance strategy. *Imagination, Cognition and Personality*, 39(2), 125–150. <https://doi.org/10.1177/0276236618820519>
- LeFebvre, L. E., Punyanunt-Carter, N. M., & Wrench, J. S. (2017). *Phantom lovers: Ghosting as a relationship dissolution strategy in the technological age. The impact of social media in modern romantic relationships*. Lexington Books.
- Manning, J., Denker, K. J., & Johnson, R. (2019). Justifications for 'ghosting out' of developing or ongoing romantic relationships: Anxieties regarding digitally-mediated romantic interaction. In A. Hetsroni & M. Tuncez (Eds.), *It happened on Tinder: Reflections and studies on internet-infused dating* (pp. 114–132). Institute of Network Cultures.
- Navarro, R., Larrañaga, E., Yubero, S., & Villora, B. (2021b). Ghosting and breadcrumbing: Prevalence and online dating. *Psychological Writings*, 13(2), 45–59. <https://doi.org/10.24310/espiescpsi.v13i2.9960>
- Navarro, R., Larrañaga, E., Yubero, S., & Villora, B. (2021a). Individual, interpersonal and relationship factors associated with ghosting intention and behaviors in adult relationships: Examining the associations over and above being a recipient of ghosting. *Telematics and Informatics*, 57, Article 101513. <https://doi.org/10.1016/j.tele.2020.101513>
- Pancani, L., Mazzoni, D., Aureli, N., & Riva, P. (2021). Ghosting and orbiting: An analysis of victims' experiences. *Journal of Social and Personal Relationships*, 38(7), 1987–2007. <https://doi.org/10.1177/02654075211000417>
- Powell, D. N., Freedman, G., Williams, K. D., Le, B., & Green, H. (2021). A multi-study examination of attachment and implicit theories of relationships in ghosting experiences. *Journal of Social and Personal Relationships*, 38(7), 2225–2248. <https://doi.org/10.1177/02654075211009308>
- Ranzini, G., Rosenbaum, J. E., & Tybur, J. M. (2022). Assortative (online) dating: Insights into partner choice from an experimental dating app. *Computers in Human Behavior*, 127, Article 107039. <https://doi.org/10.1016/j.chb.2021.107039>
- Thomas, J. O., & Dubar, R. T. (2021). Disappearing in the age of hypervisibility: Definition, context, and perceived psychological consequences of social media ghosting. *Psychology of Popular Media*, 10(3), 291–302. <https://doi.org/10.1037/ppm0000343>
- Thompson, L. (2018). "I can be your Tinder nightmare": Harassment and misogyny in the online sexual marketplace. *Feminism & Psychology*, 28(1), 69–89. <https://doi.org/10.1177/0959353517720226>
- Timmermans, E., Hermans, A.-M., & Oprea, S. J. (2021). Gone with the wind: Exploring mobile daters' ghosting experiences. *Journal of Social and Personal Relationships*, 38(2), 783–801. <https://doi.org/10.1177/0265407520970287>
- Tinder. (n.d.a). *Block contacts*. <https://www.help.tinder.com/hc/en-us/articles/360039684672-Block-Contacts>
- Tinder. (n.d.b). *I accidentally unmatched someone*. Tinder. <https://www.help.tinder.com/hc/en-us/articles/115003374003-I-accidentally-unmatched-someone>
- Tong, A., Sainsbury, P., & Craig, J. (2007). Consolidated criteria for reporting qualitative research (COREQ): A 32-item checklist for interviews and focus groups. *International Journal for Quality in Health Care*, 19(6), 349–357. <https://doi.org/10.1093/intqhc/mzm042>

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