

The Open University and University of Brighton

Paired Evaluation

Preliminary Report from the Pilot Evaluation of
the Paired App

Jacqui Gabb, Catherine Aicken, Salvatore Di Martino and Tom Witney

15th March 2021

ISBN: 978-1-4730-3227-9

Contents

Executive summary	4
About the research team	7
Acknowledgements.....	7
Introduction	8
Quality of couple relationships and the role of technology	8
What is Paired?	9
Aims of the pilot evaluation.....	9
Evaluating Paired in the context of Covid-19.....	10
Methods.....	11
Approach for the pilot evaluation.....	11
Paired as a digital intervention	11
Theory of change	11
‘Real world’ evaluation research	12
Research design	12
Data collection and sampling methods.....	13
1. In-app quiz and linked Paired app data	13
2. Survey.....	13
3. Qualitative interviews.....	13
Analyses	14
Integration	14
Reporting our findings	14
Ethical approval and data protection	15
Findings.....	16
Paired’s impact on relationship quality	16
Relationship quality and use of Paired	16
Paired’s impact on different aspects of relationship quality.....	22
How does Paired work?	28
The Benefits of Paired Index (BPI)	28
Paired users’ perceptions: mechanisms of action	37
Who uses Paired?	38
Paired users' characteristics.....	38
Conclusion.....	39
Main findings	39
Paired in the current context.....	40
Strengths and limitations of the Paired Pilot Evaluation	41

Future analyses42

References43

Appendices.....46

Executive summary

Romantic relationships are extremely important to people's happiness and well-being, yet many people do not seek advice with relationship issues or may do so only once serious problems arise.

Paired is a commercially available relationships app. Launched in October 2020, it currently has over 12,000 daily active users, predominantly in the US and UK.

Public self-management of care (i.e. self-help) is target for technological investment, as digital health and well-being apps gain popularity. There are currently over 318,000 health apps available worldwide, with a further 200+ new health apps coming onto the market each day. Research has shown that mobile health (mHealth, i.e. health and well-being apps) can be effective in supporting behaviour change: helping us to adopt and maintain healthy behaviours. However, many health and well-being apps are not based on reliable research evidence, the only indication of an app's quality deriving from 'user reviews'. Paired is evidence-based. Focusing on the area of romantic relationships, it seeks to support and enhance couple relationships, before the point when professional help may be needed.

Researchers at The Open University (OU) and the University of Brighton evaluated the effectiveness of Paired, using a mixed methods approach.¹ We gathered data from users of Paired, through:

1. A series four brief surveys, implemented via the app's 'quiz' function. These tracked key aspects of Paired users' relationship quality over approximately 3 months (3,717 participants, of which 440 provided complete data suitable for longitudinal analysis; October 2020 to early January 2021);
2. An online survey, implemented outside the app. This collected detailed data, including: demographics, relationship quality, experience of using Paired, and external impacts on relationships in 2020 (745 participants, December 2020);
3. Ongoing qualitative interviews with selected users of the app.

Paired's impact on relationship quality

We created the Quality of Relationship Index (QRI), a rigorously-developed measure of overall relationship quality.² We found that quality of communication – the underpinning dimension of all relationship maintenance behaviour – was most strongly related to overall relationship quality. In particular:

- Relationship quality (QRI) increases by 36% over 3 months' use of Paired.³
- People who use the app on 6 or 7 days per week report the highest relationship quality (QRI): 12% higher than that of people who use it on one day a week or less often.
- The length of time spent on the app per week was not influential, which suggests that it is sustained daily use rather than the quantity of time spent using the app which improves relationship quality.
- Users whose accounts are linked with their partner's account experience 45% higher relationship quality (QRI) than those who are unlinked. This pairing facilitates in-app

¹ All percentages in the Executive Summary are rounded to the nearest 1% for ease of reading.

² All analyses using QRI are based on data from the online survey.

³ Based on a comparison of people who had used Paired for different lengths of time.

interactions⁴, which is central to the app's design. Using the app together in this way may also indicate both partners' commitment to improving their relationship.

- Among people who use Paired for more than one week, we estimate that those who have 2 to 3 in-app interactions experience a 19% increase in relationship quality (QRI); whilst those who have 6 or 7 in-app interactions per week experience a 31% increase in QRI.

In developing the QRI, we explored change in different aspects of relationship quality, whilst using Paired:

- **Communication:** Over 3 months' use of Paired, we saw a steep increase in how openly users communicate with their partner, to a point where 98% agreed or strongly agreed⁵ that they communicate openly with their partner.
- Paired users clearly credited Paired with this improvement: 81% of those who had used the app for at least a month agreed that Paired had helped improve their couple communication, rising to 85% among those who used it on 6 or 7 days in a typical week.
- **Dealing with conflict as a couple:** When they first used Paired, just 16% of users *strongly* agreed that they and their partner were able to discuss and resolve conflict, but this proportion doubled within the first month, and tripled over a 3-month period (to 46%).
- The low initial percentage suggests that conflict is challenging for couples to address. Yet almost half of those who used Paired for more than one month (46%), and half of those who used it on 6 or 7 days in a typical week (50%), credited Paired with helping them to resolve relationship issues.
- **Feeling connected:** 98% of Paired users agreed or strongly agreed that they felt emotionally connected with their partners when they first used the app, leaving little room for improvement. Nevertheless, Paired still appears to benefit couples' emotional connection: the proportion *strongly* agreeing that they enjoy a positive emotional connection rose from around three-in-five, to almost four-in-five (61% to 78%) over 3 months.
- **Comfort with discussing sex life:** We found an increase over 3 months, from 45% to 55% of users *strongly* agreeing that they were comfortable with discussing their sex life together. The modest increase may reflect the fact that discussing sexual matters is widely acknowledged to be challenging for many couples.

Integration of the findings from our analyses of different data sources, and the 'dose-response' effect that we consistently observed, together give us confidence that Paired is responsible for the improvements to relationship quality that its users enjoy.

Note: Our evaluation considered Paired's short-term impact, in the context of the Covid-19 pandemic when research participants providing data in December 2020 were facing restrictions, uncertainty, and difficult decisions related to the festive period. Over a longer timeframe, and without these particular challenges, greater improvements in relationship quality may occur.

⁴ In-app interactions are termed 'conversations' by Paired.

⁵ 60% *strongly* agreed.

What makes Paired work?

- Greater duration and frequency of use of the app, having a premium (vs. free) Paired subscription, and being linked with one's partner via the app (which enables in-app interactions), were all associated with reporting greater benefits from using Paired.⁶
- People who reported experiencing greater benefits from using Paired tended to report higher relationship quality (QRI) – strengthening the evidence that Paired usage results in improvements to relationship quality.
- The above association was weakest among Paired users who reported being 'very happy' with their lives, and strongest among those who reported being 'very unhappy'. The impact of Paired therefore changes depending on the users' state. Paired may therefore be particularly beneficial to people who are dissatisfied with their life in general, and from that we could assume they are probably dissatisfied with their relationship.

Who uses Paired?

- Paired's users are diverse in terms of age, sexual orientation, relationship characteristics and parenthood, indicating that the app has broad appeal.
- Users are 29 to 30 years on average, but their ages span the whole (adult) age range. Three-quarters are heterosexual, and one-quarter are lesbian, gay, bisexual, transgender, queer or otherwise diverse in terms of their sexuality and/or gender identity (LGBTQ+ for brevity). One-in-three are married or in a civil partnership.⁷ Whilst around one third are living separately, two-thirds are living together. Paired users' relationships range from very new to long-term, with substantial proportions of both parents and childfree couples.

⁶ To assess this we used a combined measure, the Benefits of Paired Index, incorporating five possible ways in which Paired may improve relationships: improving communication, providing an effective daily reminder to do something for the relationship, helping to resolve issues within the relationship, helping to identify strengths, and helping to identify problems within the relationship.

⁷ Termed 'civil union' in some countries.

About the research team

Dr Jacqui Gabb, Professor of Sociology and Intimacy, The Open University, jacqui.gabb@open.ac.uk

Dr Catherine Aicken, Senior Research Fellow, University of Brighton, c.aicken@brighton.ac.uk

Dr Salvatore Di Martino, Researcher in Wellbeing and Social Justice, salvatore.dimartino@unina.it

Dr Tom Witney, Postdoctoral Research Associate, The Open University, tom.witney@open.ac.uk

Acknowledgements

The Open University funded this research. All partners (The Open University, University of Brighton and Better Half (Paired)) received funding and additionally provided in-kind support.

We thank the team at Better Half for the opportunity to evaluate the award-winning Paired app; for implementing the research in-app quiz and providing us with a de-identified extract of data from individuals who completed it; for promoting the survey within the app; and for comments on the feasibility of the research methods and on the draft analyses presented in this document.

We thank Dr Mathijs Lucassen (of The Open University) for expert assistance with research design and study approvals, and for providing feedback on this report.

The study was designed by members of the academic team (JG, CA and ML) independently from Better Half/Paired. Better Half/Paired were not involved in data analysis, interpretation of findings, or writing this report, responsibility for this rests with the authors.

Introduction

Quality of couple relationships and the role of technology

A romantic relationship with a partner is one of the most important parts of life. The quality of this relationship has an enormous impact on happiness, mental health and well-being, and the lives of adults (Proulx, Helms, & Buehler, 2007; Robles, Slatcher, Tombello, & McGinn, 2014; Whisman, 2008) and children (Amato & Keith, 1991; Garriga & Kiernan, 2013). About 90% of people in Western countries marry by age 50 (WPR, 2021). However, in the UK, one-in-five (18%) people (2.87 million people) in adult couple relationships are in relationships which could be characterised as ‘distressed’ (Sserwanja & Marjoribanks, 2016) and over 40% of marriages end in divorce (ONS, 2018). In the United States, around 50% of married couples divorce, and this rates as the sixth-highest divorce rate in the world (WPR, 2021). Relationship health has been identified as a public health issue and relationship deterioration a health epidemic (Cordova et al., 2014).

Despite the importance of relationships in people’s lives, over half of UK women, three-quarters of UK men, and half of US men and women in current relationships, do not seek advice for relationship issues from any source – not even online searches (Gabb & Aicken, 2020: [survey research](#) commissioned by The Open University and Paired, Summer 2020, UK n=1319, US n=1516). Among the minority who do seek advice, friends and family are the most common source. When they experience issues with their relationships and/or their partner and seek help from outside their family/social circle, people typically turn to self-help books or relationship workshops (Stewart, Bradford, Higginbotham, & Skogrand, 2016). Couple relationship education provides proactive intervention, skills and training to improve relationship quality, stability and resilience (Lucier-Gree, Birney, Gutierrez, & Adler, 2018), but access to such preventative interventions is limited and patchy in uptake. There remains considerable social stigma around use of relationship support services.

Digital interventions (such as apps) can provide convenient and private access to support and information, which is particularly appropriate for sensitive and stigmatised matters (Bailey, Mann, Wayal, Abraham & Murray, 2015), and may expand the extent to which couples look outside their relationship and/or immediate family and friends, in their search for expert advice and couple support. Public self-management of care is a target for technological investment, as digital health and well-being apps gain in popularity. In the UK, self-care apps are part of the Department of Health’s National Health Service (NHS) long-term plan (DH, 2019), epitomizing a new service model of ‘democratised healthcare’ for the 21st century (Heather, 2018). There are currently over 318,000 health apps available worldwide, with a further 200+ new health apps coming onto the market each day (IQVIA Institute, 2017; Nielsen, 2018). In 2020, the mHealth sector was valued at USD 40.05 billion and projected to rise to USD 149.3 by 2028 - growing around 17% per year (GVR, 2021).

Research has shown that mobile health (mHealth, i.e., health and well-being apps) can be effective in delivering behaviour change – helping us to adopt and maintain healthy behaviours (Cugelman, Thelwall, & Dawes, 2011; Webb, Joseph, Yardley & Michie 2010) and in the delivery of psychological interventions (Richards & Richardson, 2012). For relationship support, these technologies may be effective in building habit formation through cues, routines, and rewards (Danaher, Nyholm, & Earp, 2018). They may also enable self-monitoring, which is crucial to raising awareness of a person’s own behaviours and emotions, and thus facilitates self-management of these behaviours and emotions (Bandura, 1998). However, many health and well-being apps are not based on reliable research evidence or theory, nor are they rigorously evaluated. Often, the only indication of an app’s quality is its (potentially unreliable) ‘user reviews’.

Paired aims to make couple relationships happier and healthier. Paired provides daily prompts, has an expert focus, and is available to all couples in all relationship states. Other relationship apps work quite differently, without these features, and they are primarily targeted at couples considering or already in therapy. Paired is therefore unique in the marketplace.

What is Paired?

Paired is a mobile app designed to help couples improve their communication, stay connected, and deepen intimacy in their relationship (www.getpaired.com). Its intended users are couples of any sexuality, at any stage in their relationship. Paired was launched in October 2020 and has over 10,000 daily active users.

The app combines daily questions, weekly quizzes, and tips from world-leading therapists and academics. The purpose of these is to prompt couples to have open and honest conversations on a wide variety of topics. Content available via the Paired app corresponds to nine areas of relationship well-being (termed ‘growth areas’ by Paired), identified based on an overview of research and practice by various relationship experts (i.e., not based on any one particular model or theory). These are: conflict; communication; money and finances; home and work; sex and intimacy; meaning and growth; connection; fun and excitement; family and friends.

Daily questions and weekly quizzes are brief, and they vary in terms of which ‘growth area’ (or areas) they address – as such, the topics couples are prompted to discuss are raised by the app (and not one partner or the other). The app’s functionality enables individuals to use the app independently, or to pair their account with their partner’s. When paired, once both people in a couple have input their responses to a question or quiz, the app automatically shares their responses between the two of them (i.e., neither person needs to be the one to initiate the interaction). If unpaired, a user can still discuss the question with their partner outside the app. Paired can be downloaded for free, whilst a premium (paid-for) version of the app enables greater functionality and further content.

Aims of the pilot evaluation

- To assess Paired’s impact on relationship quality, and how this varies by:
 - ‘dosage’, i.e. duration of use, frequency of use, and intensity of use of Paired;
 - subscription type (premium or free);
 - whether or not the user’s Paired account is linked with their partner’s.
- To develop an index of relationship quality (i.e. the QRI);
- To conduct an initial exploration of how Paired works (mechanisms of action), including development of an index of benefits gained from using Paired;
- To determine who is using Paired.

Following this Preliminary Report, we will be undertaking further analyses of the data we have gathered. In-depth interviews with users of Paired are ongoing. In future, our analysis of these interviews will enable us to contribute a detailed, contextualised description of people’s experiences of using the app and its impacts. Our pilot evaluation also seeks to inform future evaluative research.

Evaluating Paired in the context of Covid-19

Our evaluation research took place during a very unusual phase in history. The Covid-19 pandemic and its control measures - e.g., lockdowns, physical/social distancing, home-working, school closures – have impacted on couples worldwide. These measures differ between nations and between US states, affecting couples in many different ways. Our findings about Paired need to be interpreted in this context.

In previous research by members of our research team, we found that relationship quality improved for some UK couples and worsened for others, over the first national lockdown period (beginning March 2020). We found a similar picture over the same period among US couples. The reasons for these changes are likely to be complex, just as the pandemic's impacts are multifaceted.

Data collection for the Paired pilot evaluation took place several months into the pandemic, by which time it was clear that Covid-19 was a long-term problem. Our survey findings confirmed that the Covid-19 pandemic was one of the main impacts on many Paired users' relationships in 2020, as we had expected. Such impacts were diverse, and could be positive, negative or ambiguous for the couple. What is clear is that couples are dealing with unusual circumstances. These couples include people who have faced restrictions to spending time together in person as well as those who have been 'locked in' together. The pandemic has also impacted upon long-term, established couples as well as couples who began their relationships during the pandemic and who may still be getting to know each other.

Methods

Approach for the pilot evaluation

Paired as a digital intervention

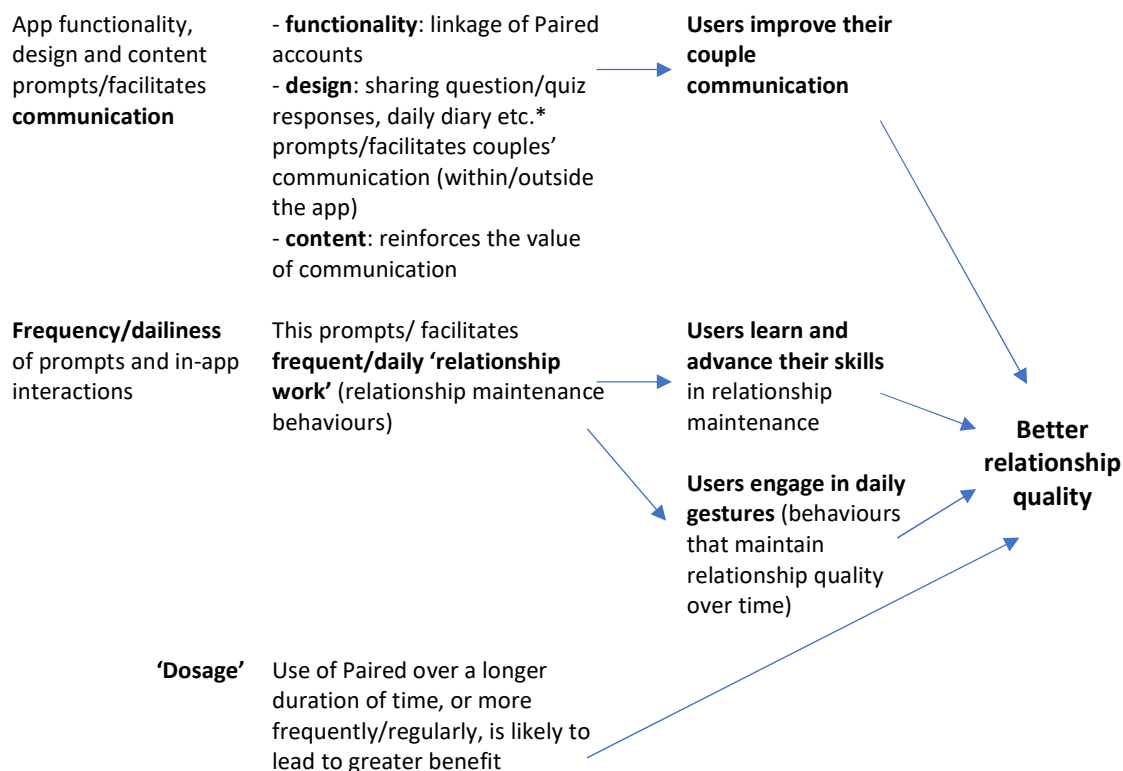
We conceptualised Paired as a digital intervention, which primarily aimed to improve relationship quality. Digital interventions are complex (Appendix 1) and it is best practice to evaluate them using a mixed-methods approach (Catwell & Sheikh 2009, Lilford, Foster & Pringle, 2009) which integrates the findings of different research methods. Evaluation is guided by a theory of change: a *simplified* model of how the intervention (Paired app) is anticipated to impact upon its users' relationships.

Theory of change

We developed a provisional theory of change for Paired (Figure 1), based on our understanding of how the app may work and findings from our earlier research on [Enduring Love](#). This is composed of three strands:

- (1) Paired's functionality, design and content are designed to prompt/facilitate **communication** about the relationship, within the couple. It is well-substantiated that improving couple communication can lead to improved relationship quality (Gabb & Fink, 2015).
- (2) The regularity (**dailiness**) of notifications and in-app interactions could prompt and facilitate daily 'relationship work' by the couple. This is expected to help users to learn and advance their relationship maintenance skills, and to engage in daily gestures that are important to maintaining relationships.
- (3) **Dosage**: it is expected that greater use of Paired will lead to greater benefit

Figure 1: Provisional Theory of Change for Paired



**In-app interactions (e.g. sharing an answer to a question with your partner, and responding to their answer) are termed ‘conversations’ by Paired. Question/quiz responses are designed to be shared/discussed with a partner. For couples whose accounts are paired, sharing occurs via the app, but it can also occur ‘offline’ as well or instead (e.g. for users who have unlinked accounts).*

‘Real world’ evaluation research

Our research was influenced by the implications of evaluating an app that is already on the market. At this stage, Paired cannot easily be evaluated using experimental research design (e.g. where one group of people are given the app, and another is given an alternative or no intervention (control), and both groups are researched over time). Paired is not ‘standardised’: new features and functionality are being added (although no major changes were made during data collection, and none that affected the theory of change), and content is continually refreshed. Paired users have flexibility and control about how, how much, and when they engage with the app (in contrast to, e.g. a 6-session course of relationship therapy). We addressed these logistical and methodological constraints through our research design and the data we collected.

Research design

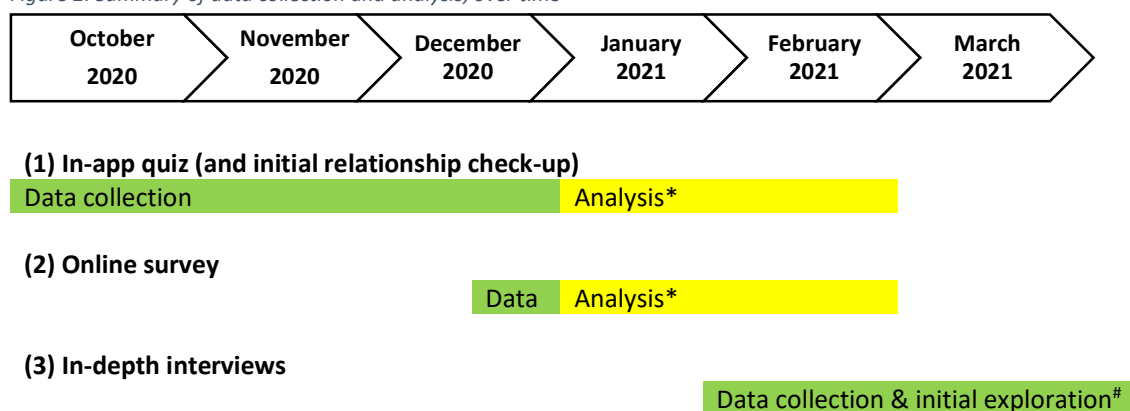
We conducted the Paired pilot evaluation with users of the Paired app. Our use of multiple methods, each with their own strengths, and integration of the findings obtained via each method, gives our research greater rigour and strengthens the conclusions that we can draw (Bazeley, 2018).

The data we collected comprised:

1. A 5-item **in-app quiz** (i.e. brief survey within the Paired app), run three times in Autumn/Winter 2020, providing longitudinal quantitative data on relationship quality. Quiz responses were linked with quiz participants’ data from Paired (including an initial ‘relationship check-up’ which also had the format of a brief survey).
2. A 30-item **online survey**, hosted outside of the app (and not linked with Paired usage data). This provided quantitative and qualitative data, and was run once in December 2020.
3. **In-depth interviews** conducted online with a sub-sample of survey participants, providing qualitative data (January 2020 onwards)

Data collection tools and samples are described in Appendices (p46 onwards).

Figure 2: Summary of data collection and analysis, over time



**Preliminary analysis for the current report. Further analyses will be also conducted. #Ongoing.*

Data collection and sampling methods

1. In-app quiz and linked Paired app data

Paired runs weekly quizzes with all users. As part of our evaluation, at three monthly time points (starting 30th October), this feature was replaced by a 5-item research quiz (in-app quiz – ‘monthly check-in’), which was clearly identified as part of university-led research. This asked users to state how much they agreed or disagreed with four statements about different aspects of their relationship quality, and a fifth statement on Paired’s impact on communication (Appendix, p47).

In early January 2021, Paired provided the researchers with a de-identified data extract, containing data from Paired users who had completed one or more of the research in-app quizzes. The data extract included items such as: quiz responses, activities undertaken on the app, and whether the user was linked or unlinked with their partner on Paired.⁸ It also included data from Paired’s ‘relationship check-up’, which users can complete when they first download the app. This contained four statements similar to those in the research in-app quiz. We used this to indicate the status of the four aspects of relationship quality explored in the in-app quiz, at baseline, i.e. when users began using the app. (Appendix, p47 compares the wording of statements in these two data sources.)

The relationship check-up and three monthly in-app quizzes together provide four data points – spanning approximately three months from October 2020 – allowing us to track four aspects of relationship quality over time since starting to use Paired. From a total of 3,717 in-app quiz participants, we restricted the sample that we analysed to people who also completed the relationship check-up quiz in October 2020, and completed all three in-app quizzes, with at least 7 days between each. This gave us four data points for each person that were spaced apart in time over approximately 3 months.⁹

Further details are provided in the Appendix (p47).

2. Survey

The Paired Evaluation survey was promoted via in-app messages containing a link to the survey (hosted outside of the app), in late December 2020. As thanks for completing the survey, participants were offered the chance to win one £100 voucher (or equivalent in another currency). They could also provide their email address if they were willing to be contacted regarding a research interview (described below).

Further details, and survey questions, are provided in the Appendix (p49).

3. Qualitative interviews

Individual, semi-structured interviews are currently being conducted, online, with a purposive sample of survey participants (i.e. selected to broadly represent a range of Paired users). Further details are provided in the Appendix (p75).

⁸ Paired has recently enabled users to provide information about their demographics and interests, on an optional basis. This is a recent feature. In our sample, we found these data were frequently missing.

⁹ We did this because if a person completed the check-in and the first quiz very close together in time, it is likely that there would be no or very little change in their responses. Research in-app quizzes were available at monthly intervals, but remained available on the app, and we found that some users had completed them very close together, causing the same problem. Restricting our analysis to people who completed quizzes with at least 7 days’ interval allowed for a more accurate assessment of the impact of the app.

Analyses

In-app quiz (including ‘relationship check-up’) data were analysed longitudinally, in order to measure the impact of using Paired over approximately three months, in a group of people who all started using the app in October 2020.

The survey provided more detailed data than the in-app quiz, collected at one point in time from each user. We compared different individuals’ relationship quality by how long they reported having used the app. We also made this comparison by the frequency/regularity and intensity with which they used the app (on how many days in a typical week, for how much time in a typical week).

In-app quiz and survey data were exported to IBM SPSS and R softwareⁱ for descriptive, inferential statistical analyses and data visualisation through graphs. Further details on statistical analysis methods for the quantitative data (from the in-app quiz and online survey), and the software we used to conduct these analyses, are provided in the Technical Appendix (p78).

In order to explore the impact of Paired on relationship quality, we developed an index of relationship quality, the Quality of Relationship Index (QRI). This index was an output of our research, and so we briefly outline its development where we describe it (p16) and provide further detail in the Technical Appendix (p78). We also developed an index of Paired’s benefits, the Benefits of Paired Index (BPI), described on p28, with further detail in the Technical Appendix.

Analyses of qualitative data are ongoing.

Integration

We integrated the findings from the in-app quiz and survey in order to best address our research aims (p9). This is reflected in the structure of this report. All research methods have strengths and weaknesses, and the process of integration is akin to looking at the same research ‘problem’ in different ways and from different perspectives, giving greater rigour to our research and greater certainty to our conclusions (Bazeley, 2018).

In this preliminary report we present quotes from qualitative survey responses and interviews, for illustrative purposes, in order to bring our quantitative research findings to life (O’Cathain & Thomas, 2004; Bazeley, 2018). Formal qualitative analysis has not yet been undertaken.

Reporting our findings

In the Findings and Conclusions sections of this report, we present findings of statistical analyses in the text (words) and as figures (graphs). Unless otherwise specified, all the differences between groups and changes over time in the numbers and percentages that we draw attention to in the text have been tested for statistical significance, based on a p value of < 0.05 , with 95% confidence intervals that do not include zero. This means that we can be confident that the differences we have observed are not due to chance. We also report effect sizes as a measure of the strength of the results of our statistical analyses.

Ethical approval and data protection

Ethical approval was provided by the Open University Human Research Ethics Committee, refs: HREC/3759/Gabb (in-app survey and linked app usage data), and HREC/3797/Gabb (online survey and interviews). The Data Protection Impact Assessment asset register reference is 0904083.

Findings

Paired's impact on relationship quality

Summary of data sources and methods

We explored the impact of Paired on relationship quality using:

- Quantitative data (from the in-app quiz and initial relationship check-up) on relationship quality over a 3-month period of using the app (N=440);
- More detailed quantitative data (from online survey) on relationship quality, and user-reported data on app usage, measured at one point in time (N=745);
 - Survey data were used to create a summary measure of relationship quality, namely the Quality of Relationship Index (QRI);
- Qualitative data from the survey and ongoing in-depth interviews.

Relationship quality and use of Paired

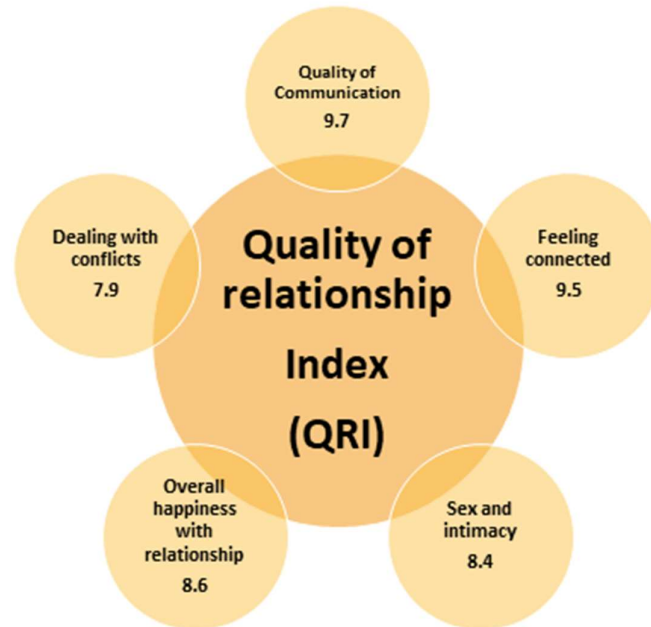
The Quality of Relationship Index (QRI) – a Paired pilot evaluation research output

We created the Quality of Relationship Index (QRI), as a detailed, rigorously-developed measure of overall relationship quality.ⁱⁱ QRI is expressed on a scale of 0 to 10, with 10 being the highest possible score. QRI is based on combining responses to 17 statements which address aspects of the quality of couple relationships. We grouped these into five components:

1. Quality of communication
2. Feeling connected
3. Capacity to deal with conflict as a couple
4. Sex and intimacy, and
5. Overall happiness with relationship

In Figure 3, the numbers in each circle show on a scale of 0 to 10 how strongly each component is related to the QRI. 'Quality of communication' (at 9.7) is most strongly related to QRI, followed by 'feeling connected' (at 9.5); whereas 'dealing with conflicts' (at 7.9) is the least strongly related of the five components. This can be interpreted as indicating that the quality of communication, and emotional connectedness, are particularly important to Paired users' overall relationship quality.

Figure 3: Components of the Quality of Relationship Index



'Paired assisted us to look at different ways of communication, to explore ways of being intimate and create a deeper connection.'

Female, Australia, 25-34, bisexual, cohabiting, no children (survey data)

'It helps to not have to come up with topics to talk about and we talk more preventatively then waiting for an issue to arise. And it's easier to take it one step at a time and not get overwhelmed by all the places that can be improved.'

Female, US, 35-44, married, heterosexual (survey data)

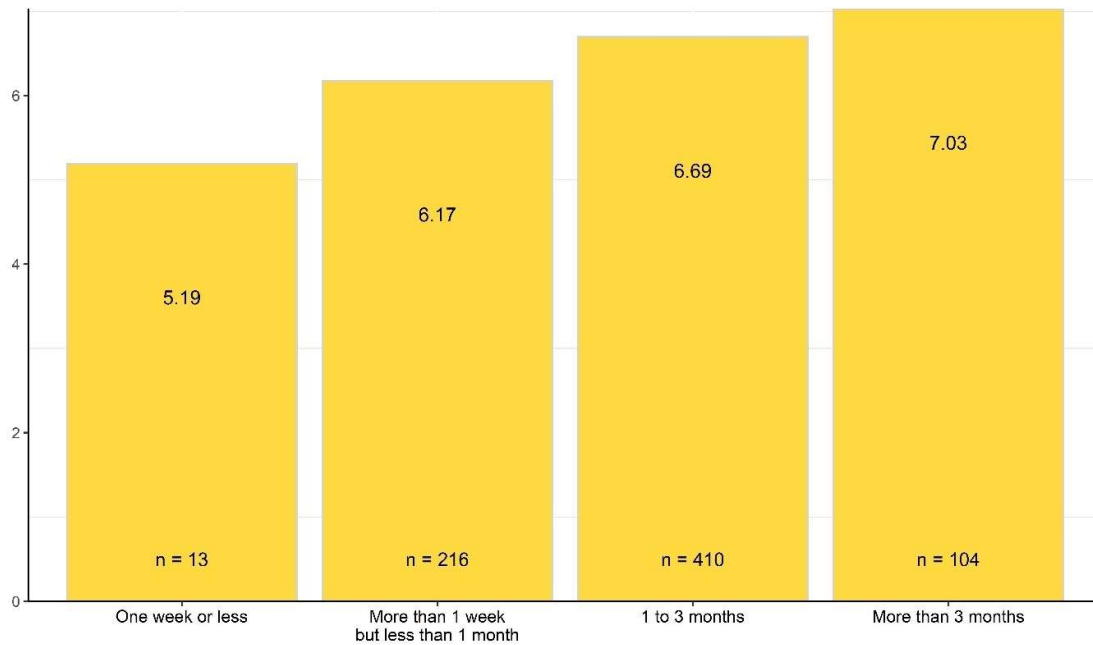
'More opportunities for sharing feelings, love, gratitude. Positively impacted mental health and well-being'

Non-binary, Australia, 25-34, cohabiting, queer (survey data)

Relationship quality and duration, frequency and intensity of use of Paired

Figure 4 shows a steady increase in QRI with increasing duration of use of Paired. There was a 35.5% increase in relationship quality between new users (who reported having used the app for one week or less, QRI 5.19) and people who had been using the app for more than 3 months (QRI 7.03).ⁱⁱⁱ Corroborating this, almost half (45.5%) of Paired users agreed or strongly agreed that the longer they use Paired, the better their relationship gets.¹⁰ People who had used Paired for more than one month were more likely to agree or strongly agree with this statement, compared to new users (49.0% vs. 37.4%).¹¹

Figure 4: Relationship quality (QRI) by duration of use of Paired



Survey question: 'How has your relationship changed since using Paired?'

'It's grown stronger that's for sure. Not that it wasn't strong to begin with; but it's helped keep us connected actively on a daily basis'

Male, Australia, 35-44, heterosexual, living apart, children at home

'We get to have a small everyday task to show our commitment to each other'

Female, US, 25-34, lesbian, living apart

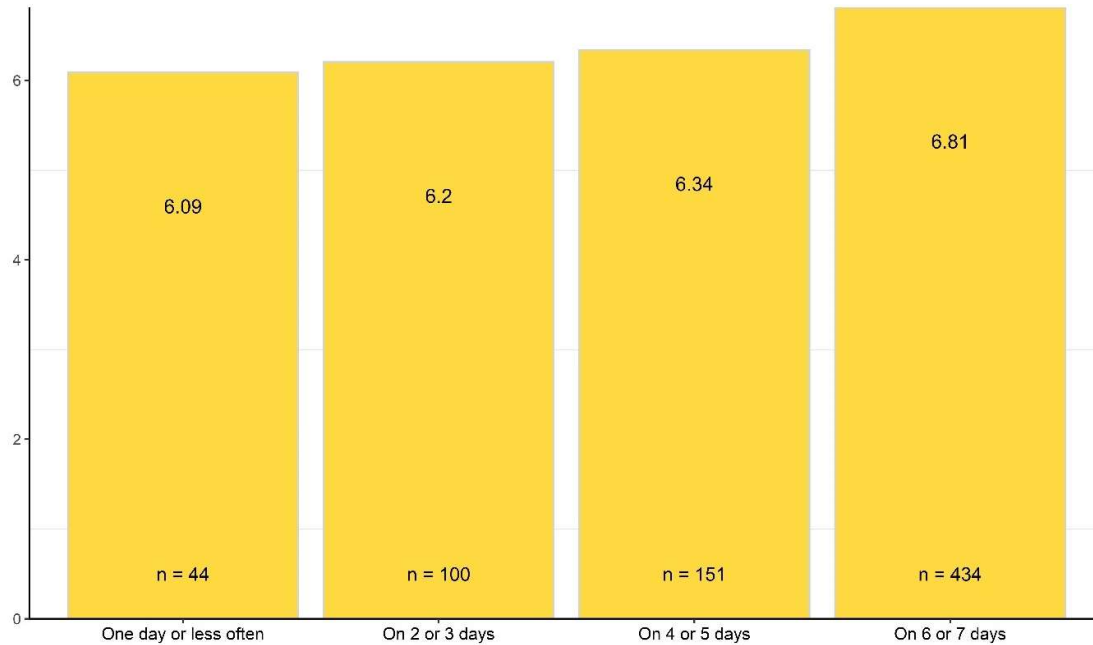
¹⁰ Most of the remainder selected 'neither agree nor disagree' in response to this statement. 95% confidence interval, CI: 41.9-49.1%.

¹¹ 95% CIs: 44.7-53.3% and 31.1-43.7%, $p < 0.01$.

Findings (1): Paired's impact on relationship quality

Frequency of use of Paired (number of days used in a typical week, among people who had used Paired for more than one week) was also positively associated with relationship quality (Figure 5). The relationship quality of people who reported using Paired on 6 or 7 days per week was 11.8% higher (QRI 6.81) than that of people who reported using Paired on one day a week or less often (QRI 6.09).^{iv}

Figure 5: Relationship quality (QRI) and number of days using Paired in a typical week



'It's a fun little thing to do every day and the answers usually bring a smile to both of our faces'
Female, US, 18-24, steady relationship but not living together, heterosexual (survey data)

'Paired is helping us build a healthier and stronger collective mental health and happiness. We feel happier and more satisfied in our relationship with a daily reminder to connect and experience a moment of closeness despite the business of the day.'
Female, Australia, 18-24, bisexual, cohabiting, no children (survey data)

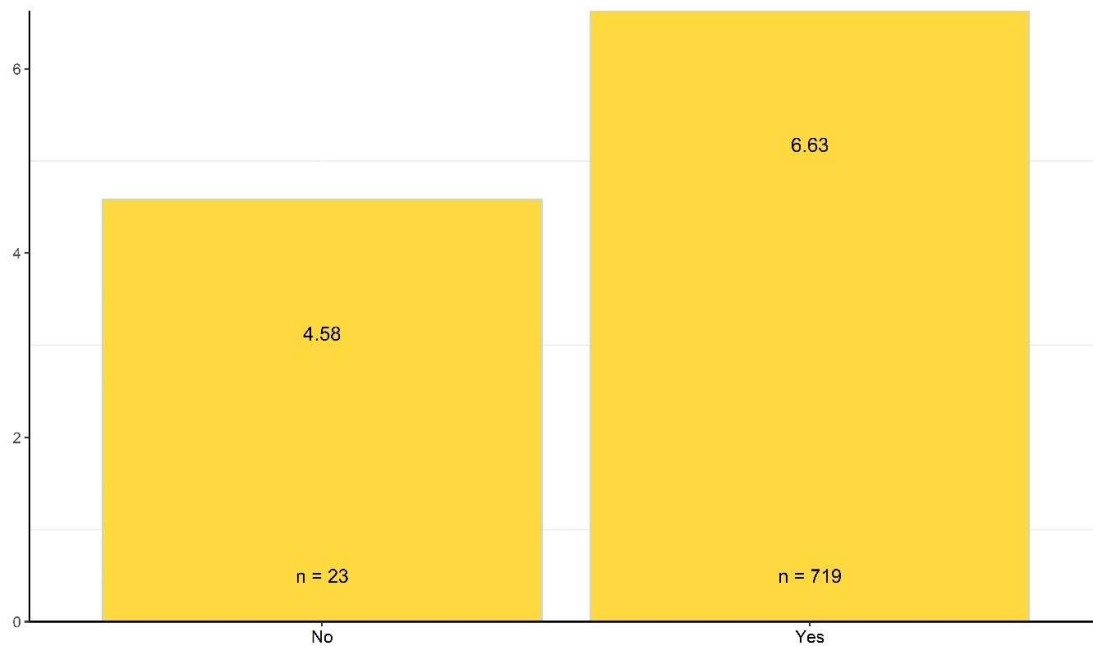
By combining the results presented in Figure 4 and Figure 5, we estimate that people who use Paired on 2 to 3 days a week experience a 19.4% increase in relationship quality (QRI) after using Paired for more than a week.¹² This is likely to correspond to 2 or 3 in-app interactions per week (termed 'conversations' by Paired). For more frequent in-app interactions, the corresponding increases in relationship quality are: 22.2% increase in QRI for 4 to 5 in-app interactions per week; and 31.2% increase in QRI for 6 to 7 in-app interactions per week.

We found no statistically significant association between the total amount of time spent using Paired in a typical week, and quality of relationship as measured by the QRI.¹³ This suggests that while sustained and daily use of Paired impact on relationship quality, it is not necessary to dedicate a lot of time to using the app.

Relationship quality and linkage with partner on the app

Being linked with a partner on the app was positively associated with relationship quality. As shown in Figure 6, people whose Paired accounts were linked with their partners' experienced 44.8% greater relationship quality (QRI 6.63) compared with people whose accounts were not linked with a partner's (QRI 4.58).^v

Figure 6: Relationship quality (QRI) and linkage with partner on Paired



'It makes me smile when I see he has answered a question'

Female, Australia, 25-34, heterosexual, cohabiting, children (survey data)

'We have only just started using it and have taken just one quiz together. I think what's helped is the conversation we had about trying the app and what we hope to get from it. THAT alone was a positive and helpful thing.'

Female, US, 55+, heterosexual, married (survey data)

¹² We estimated this by dividing numbers in Figure 5 by relationship quality after less than one week of using Paired (5.19, see Figure 4). People who have been using Paired for 'more than a week' includes people who have been using the app for some months.

¹³ Among people who reported having used Paired for more than one week.

Does Paired improve relationship quality? Users' perceptions

The survey asked users directly about how Paired is potentially helping them. This enabled us to examine the extent to which users attribute the improved relationship quality that they (may) experience to their use of Paired. In particular, they might, for example, ascribe changes in their relationships to other causes, such as their circumstances changing, or the positive impacts of advice-seeking from other sources.

Three out of five people (59.5%) agreed or strongly agreed that their relationship felt stronger since using Paired.¹⁴ People who had been using the app for one month or more were more likely to report this than newer users (64.3% vs. 48.5%),¹⁵ and people who used the app on 6 or 7 days in a typical week were more likely to report this than those who used it less often (70.6% vs. 54.1%).¹⁶

(We discuss these further, and specific benefits ascribed to using Paired, in the section *What makes Paired work?* p28 onwards).

¹⁴ 95% CI: 56.0-63.0%

¹⁵ 95% CIs: 60.2-68.4% and 42.0-55.0%, $p < 0.001$ for difference.

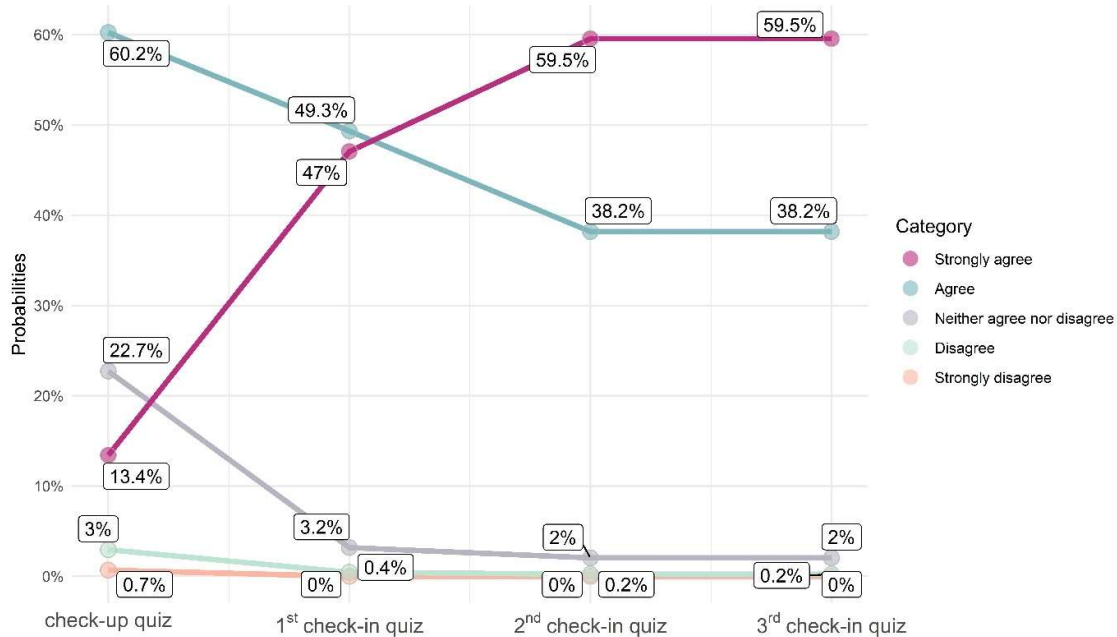
¹⁶ Amongst those who had used the app for at least one month. 95% CIs: 65.6-75.6% and 47.1-61.1%, $p < 0.001$.

Paired's impact on different aspects of relationship quality

Communication

Over 3 months' use of Paired, we found a large increase in the likelihood of answering 'strongly agree' to the statements: 'I am very satisfied with how we communicate with each other' (initial relationship check-up) and 'We communicate openly with each other' (in-app quizzes). The percentage of users selecting 'strongly agree' increased from 13.4% to 59.5% over this period (Figure 7).^{vi,17} After 3 months' use of Paired, a total of 98% agreed or strongly agreed that they and their partner communicate openly with each other.

Figure 7: Change in relationship quality over time: Communication



Note on Figure 7: In each quiz, percentages sum to 100%. A decline over time in the percentage of people selecting 'agree' is accounted for by an increase in the percentage selecting 'strongly agree' – i.e. over time, there is stronger agreement with the statements.

Over three-quarters of survey participants (76.1%) reported that Paired is improving how they communicate as a couple.¹⁸ We found that people who had been using Paired for one month or more were more likely to report this, compared to new users of the app (80.5% vs. 66.1%).¹⁹ Taken together with the findings presented in Figure 7, the evidence suggests that Paired's benefits to couple communication are apparent within the first month of using the app, increase further with longer use of Paired, and that users credit Paired with the communication benefits that they experience.

We compared users' perceptions of Paired's impact on communication by how many days they reported using the app in a typical week (among survey participants who had used Paired for one month or more). Over half of them reported using Paired on 6 or 7 days a week, and those who did

¹⁷ The difference in the wording of the statements may have contributed to the large difference observed between the relationship check-up (first point) and the three in-app check-in quizzes.

¹⁸ 95%CI: 73.0-79.1%.

¹⁹ 95%CI: 77.1-83.9% and 59.9-72.3%, $p < 0.001$ for difference.

this were more likely to agree that it was improving their communication as a couple (84.9% vs. 74.0%), compared to those who used it less often (5 days per week or fewer).²⁰

'We communicate much more clearly with one another. We have learnt things about one another from the daily questions that neither knew beforehand.'

Female, Australia, 25-34, bisexual, cohabiting, no children (survey data)

'[Paired] enabled us to resolve issues through tips and other resources, stimulating remedial conversations'

Male, UK, 18-24, living apart (survey data)

Survey question: How has Paired helped you...?

'By being the catalyst for a conversation.'

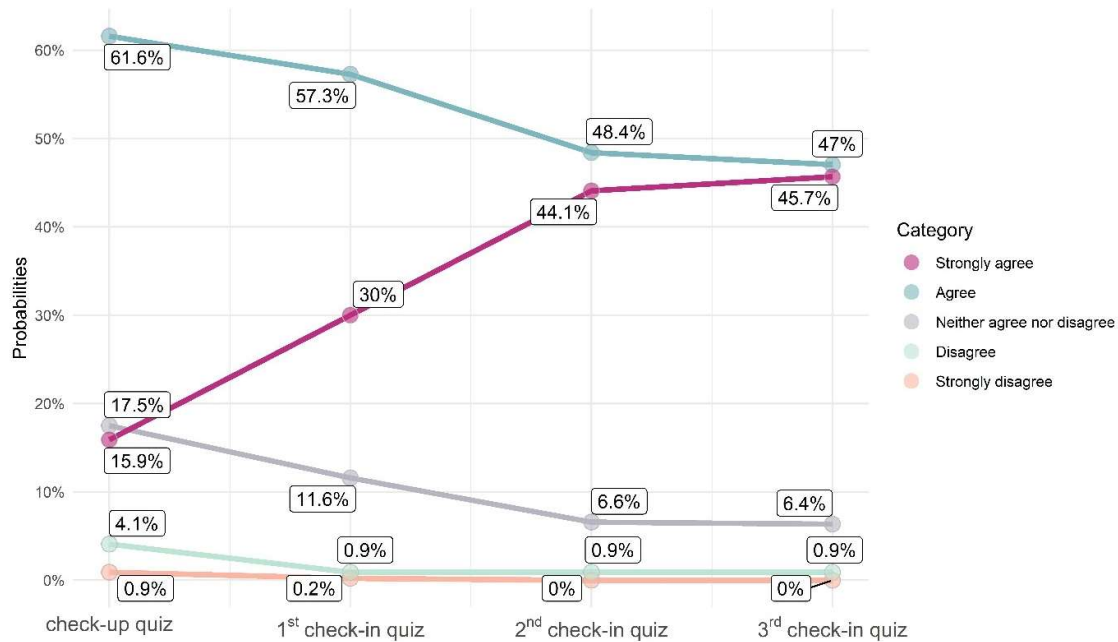
Male, Australia, 45-54, bisexual, married, children at home

²⁰ 95%CI: 81.0-88.8% and 67.9-80.1%, $p=0.002$ for difference.

Dealing with conflict

Capacity to deal with conflict as a couple also increased whilst using Paired for about 3 months. When they first used the app, around 16% of users reported that they strongly agreed with the statement 'We are able to discuss and resolve conflict'. This almost doubled to 30% within the first month of using Paired; and tripled over the 3-month period to 46% (Figure 8). After 3 months, 93% agree or strongly agreed that they are able to discuss and resolve conflict.^{vii}

Figure 8: Change in relationship quality over time: Capacity to deal with conflict as a couple



Note on Figure 8: In each quiz, percentages sum to 100%. A decline over time in the percentage of people selecting 'agree' is accounted for by an increase in the percentage selecting 'strongly agree' – i.e. over time, there is stronger agreement with the statement.

This aspect of relationship quality was most closely measured in the survey by a question asking the extent to which participants agreed that Paired had helped them to resolve issues within the relationship. Two out of five (39.8%) agreed or strongly agreed that Paired had helped them to resolve issues in their relationship.²¹ This proportion was higher among people who had been using the app for longer (45.5% among people who had used Paired for one month or more, vs. 26.5% among those who had used it for a shorter time period).²² People who used it on 6 or 7 days in a typical week were more likely to report this benefit compared to those who used it less often (49.5% vs. 39.3%).²³

²¹ 95%CI: 36.3-43.3%

²² 95%CIs: 41.2-49.8% and 20.7-32.3%, $p < 0.001$ for difference.

²³ Amongst those who had used Paired for one month or more. 95%CIs: 44.0-55.0% and 32.5-46.1%, $p = 0.02$ for difference.

'We don't just yell at each other now when we are both mad. I communicate when stuff bothers me now a lot more. We are more open to sexual critiques'

Male, US, 18-24, heterosexual, steady relationship, not cohabiting (survey data)

'...some of the questions we've answered [on Paired] has gotten us to talk about why we both approach conflict the way that we do and how we can phrase things better to accommodate each other's styles.'

Female, US, 35-44, bisexual, cohabiting, children at home (interview)

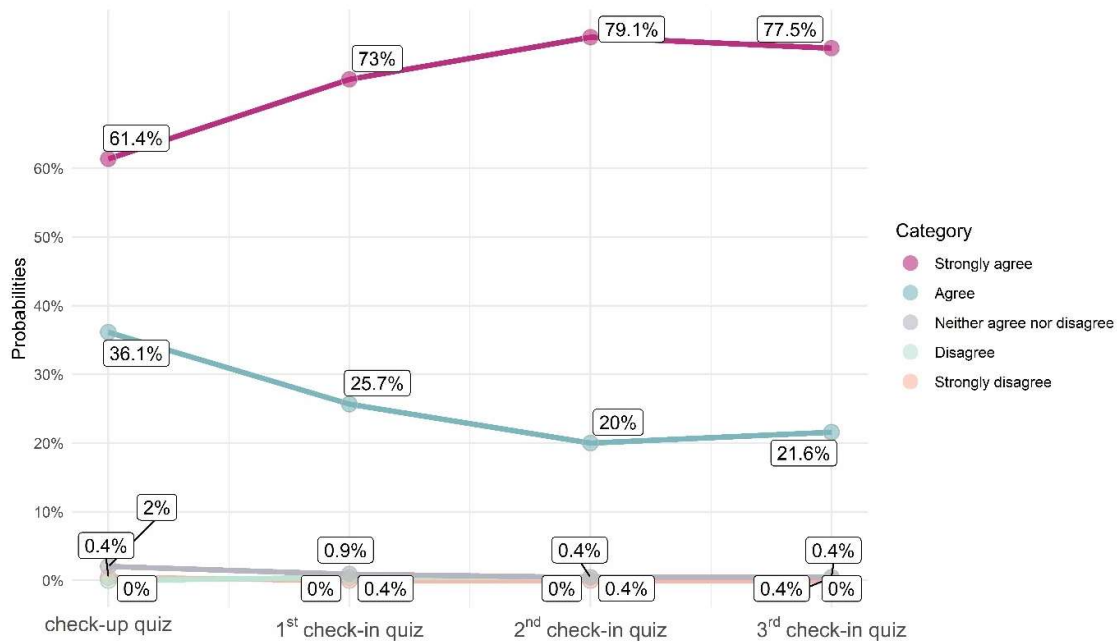
'We are less apprehensive of difficult questions- we know even an imperfect answer is a great start'

Female, Australia, 18-24, heterosexual, living apart, no children (survey data)

Emotional connection

When they first started using the app, Paired users were asked the extent to which they agreed or disagreed with the statement 'I feel connected with my partner emotionally', and in the in-app quiz the corresponding statement was 'We enjoy a positive emotional connection'. At the outset, a high 98% agreed or strongly agreed that they felt emotionally connected with their partner, which leaves little room for improvement. Nevertheless, the proportion selecting 'strongly agree' rose from around three-in-five to almost four-in-five (61.4% to 77.5%, Figure 9).^{viii}

Figure 9: Change in relationship quality over time: Emotional connection



Note on Figure 9: In each quiz, percentages sum to 100%. A decline in the percentage of people selecting 'agree' is accounted for by an increase in the percentage selecting 'strongly agree'.

'I feel closer and more connected to my partner. Even when we are busy and may not see each other physically, we are both connecting via the app.'

Female, UK, 35-44, heterosexual, married (survey data)

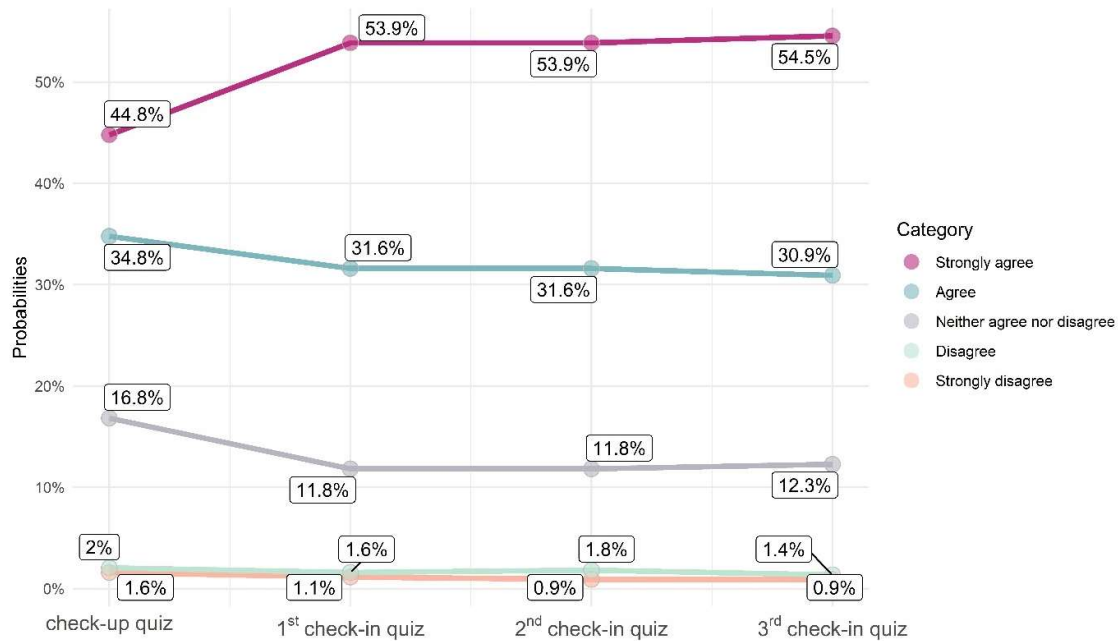
'I feel closer to my partner and am less stressed about our issues. Instead of me just thinking about our issues, we are openly discussing them.'

Male, US, 25-34, cohabiting (survey data)

Comfort with discussing sex life as a couple

We found a small increase in how comfortable people reported feeling about discussing their sex life. At the outset, 44.8% of people strongly agreed that they felt comfortable with this, rising to 54.5% by 3 months (Figure 10). This is an aspect of relationship quality which may be less affected by short-term use of Paired (especially compared with communication, p22, or capacity to deal with conflicts, p24)^{ix}, and where many Paired users started from reporting a relatively high level of openness, considering these matters are sensitive to discuss.

Figure 10: Change in relationship quality over time: Comfort with discussing sex life



'I don't know, we just don't talk about those ones [sex and physical intimacy] as much. Maybe because I think it's mostly because we're both so confident that that's something we're good at.'
Female, US, 18-24, heterosexual, cohabiting, no children (interview)

'We joke because I always put I want more [sex]. [...] Because I'm a bit of a prude, I wouldn't talk about it, but because it's in the app I'll be like, yeah. I'll put a dead angry face [emoji] that I want more [sex]. So it is starting those conversations which is helpful.'
Female, UK, 18-24, heterosexual, cohabiting, no children (interview)

'I remember that we got the same [quiz] two or three times, and it was about sex and intimacy. And the first one we got, we got a few things that were different and then we talked about it. And by the end we managed to match on everything. [...] it prompted that discussion and we talked about things that maybe we wouldn't have, and then we managed to be aligned in the end [...] ...it has to do with our own struggles of mental health. So it kind of helped us be on the same page and understand each other better. But because there are deeper issues at play it will take something a bit more than Paired to fix it.'
Male, UK, 25-34, bisexual, cohabiting, no children (interview)

How does Paired work?

Findings presented in the previous sections already provide some evidence of the role of dailiness, and Paired 'dosage' (see Theory of Change, p11)²⁴ in enhancing relationship quality and its different aspects; and in the extent to which users experience positive changes in their relationships that they perceive to be due to using Paired. This section presents additional findings on this topic.

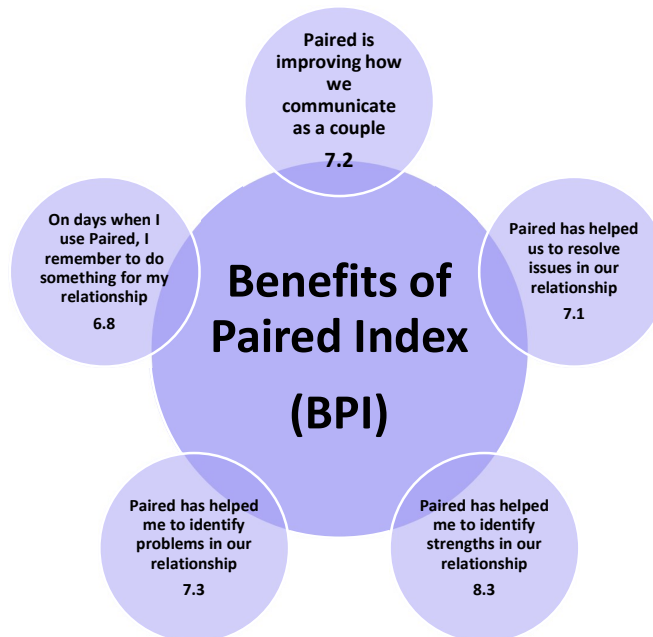
The Benefits of Paired Index (BPI)

We developed the Benefits of Paired Index (BPI) in order to explore *how* Paired works to deliver improved relationship quality.

The Paired evaluation survey included 9 statements on possible ways (or extents to which) Paired impacts on users' relationships. Using the same approach as we adopted for the Quality of Relationship Index (QRI), we combined 5 of those statements (i.e. the sub-components) to build the 'Benefits of Paired Index' (BPI):^x

1. Paired is improving how we communicate as a couple
2. Paired has helped us to resolve issues in our relationship
3. Paired has helped me to identify strengths in our relationship
4. Paired has helped me to identify problems in our relationship
5. On days when I use Paired, I remember to do something for my relationship

Figure 11: The Benefits of Paired Index (BPI)



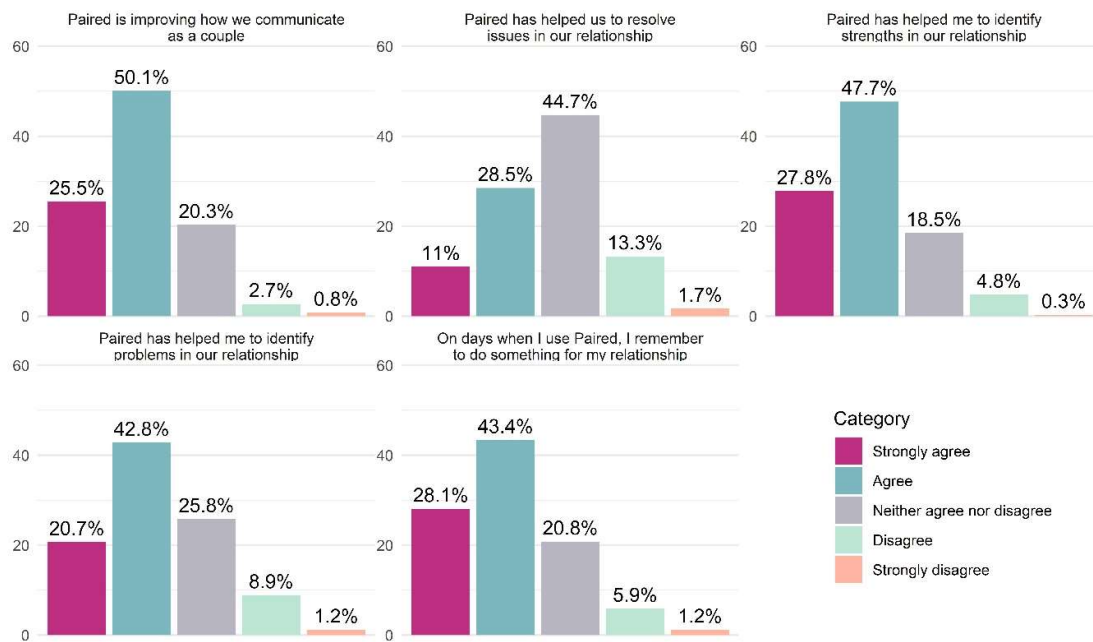
The numbers within each circle show, from 0 to 10, how strongly each sub-component is related to the Benefits of Paired Index. The statement '*Paired has helped me to identify strengths in our relationship*' is the most strongly related (at 8.3) to the BPI overall, whereas '*On days when I use*

²⁴ As described in the Theory of Change, i.e. duration of Paired use, and regularity/frequency of use (dailiness) measured by days used in a typical week.

Paired, I remember to do something for my relationship is the least strongly related (at 6.8) to the BPI.

This suggests that of these 5 benefits offered by Paired, the most important to users is the fact that Paired can help them to identify strengths in their relationship. It appears that users attach less importance to how Paired helps them to remember to do things for their relationship (despite the associations we have shown in previous sections of the report, between more frequent/daily use of Paired and greater improvements to relationship quality). Figure 12 shows the distribution of responses to each of the five items within the BPI.

Figure 12: Distribution of responses to items used in the Benefits of Paired Index (BPI)



'It's a good reminder to focus on our relationship a little.'

Female, Australia, 35-44, heterosexual, married, children at home (survey)

'Convo topics help to bring up things we may have never thought about needing to talk about'

Female, US, 18-24, 'other' sexuality (not specified), cohabiting (survey)

'It brought awareness to where we may have thought was fine but needed some help.'

Female, Australia, 18-24, heterosexual, cohabiting, no children (survey)

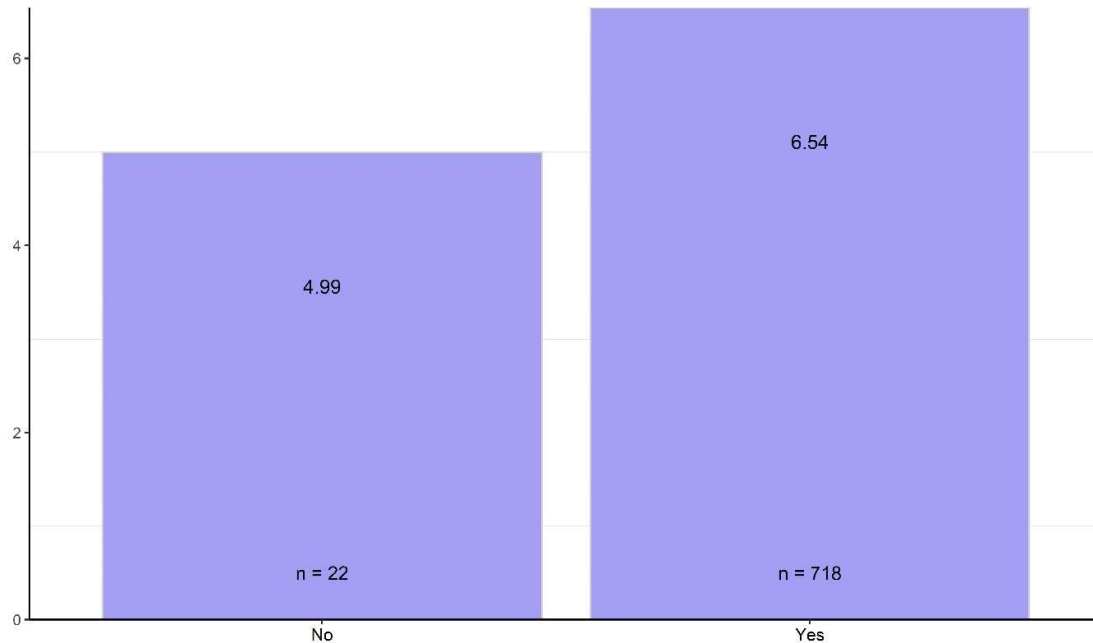
'We're slightly better able to talk about things that bother us but mostly the dilly [daily] questions are cute. I should use it more, one of the classes was really great.'

Female, US, 25-34, lesbian, living apart (survey)

Benefits of Paired and linkage of Paired accounts

People whose accounts were linked with their partner's account found Paired to be more beneficial (as measured by BPI; Figure 13). BPI was 31.1% greater among those with linked accounts (BPI 6.54), compared with those whose accounts were unlinked (BPI 4.99).^{xi}

Figure 13: Benefits of Paired (BPI) and linkage via the app



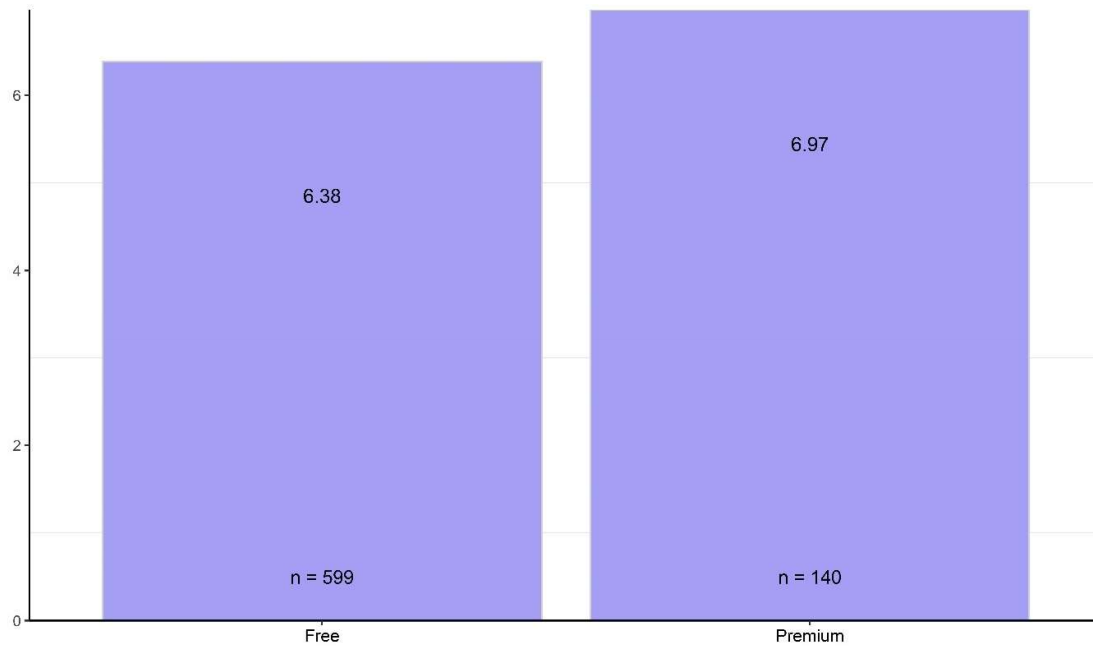
'I can't even tell you how many times [...] we've had the daily question on Paired and you can't see your partner's answer until you answer, we've said the exact same thing. So many times. And it's reassuring. You know, it's nothing the app actually did, but just the fact that we both answer the same way for some of these things, it reminds me, yes we do feel the same, we do think the same, we want the same things, you know, so in a way that's actually helped me maintain my even keel.'

Female, US, 35-44, bisexual, cohabiting, children at home (interview)

Benefits of Paired and free vs. premium accounts

The type of account that users subscribe to also had an impact on how beneficial they found Paired to be (Figure 14). BPI was 9.2% greater among Paired users with premium accounts (BPI 6.97) compared to users with free accounts (BPI 6.38).^{xii}

Figure 14: Benefits of Paired (BPI) and type of account

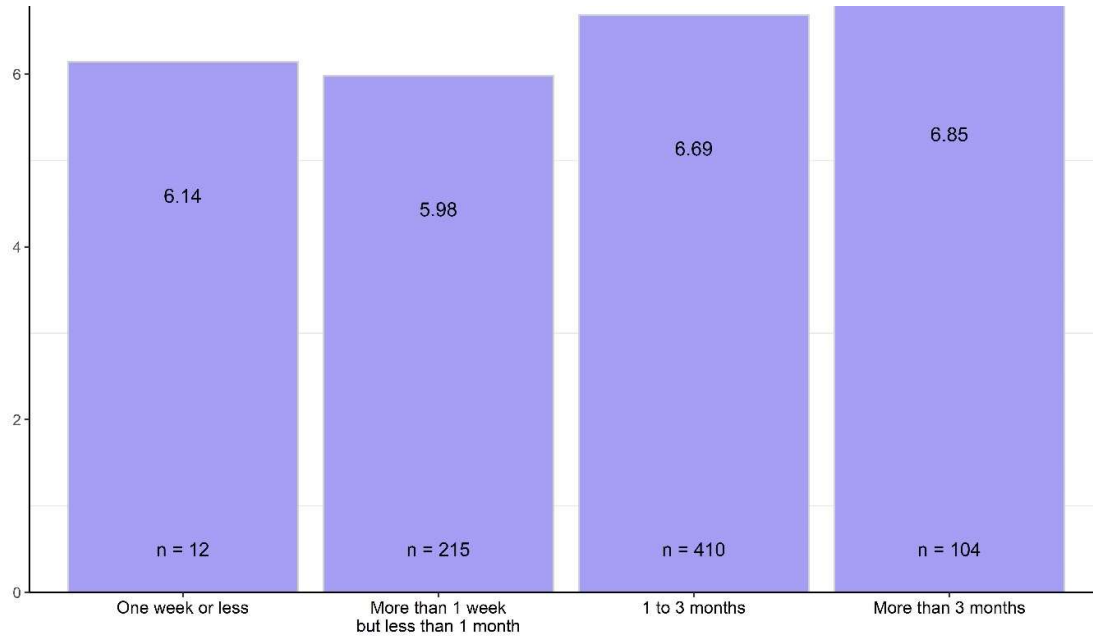


Benefits of Paired and 'dosage'

Overall, greater use of Paired is associated with finding the app more beneficial, as indicated by BPI scores (similar to the association with relationship quality, QRI, discussed previously).

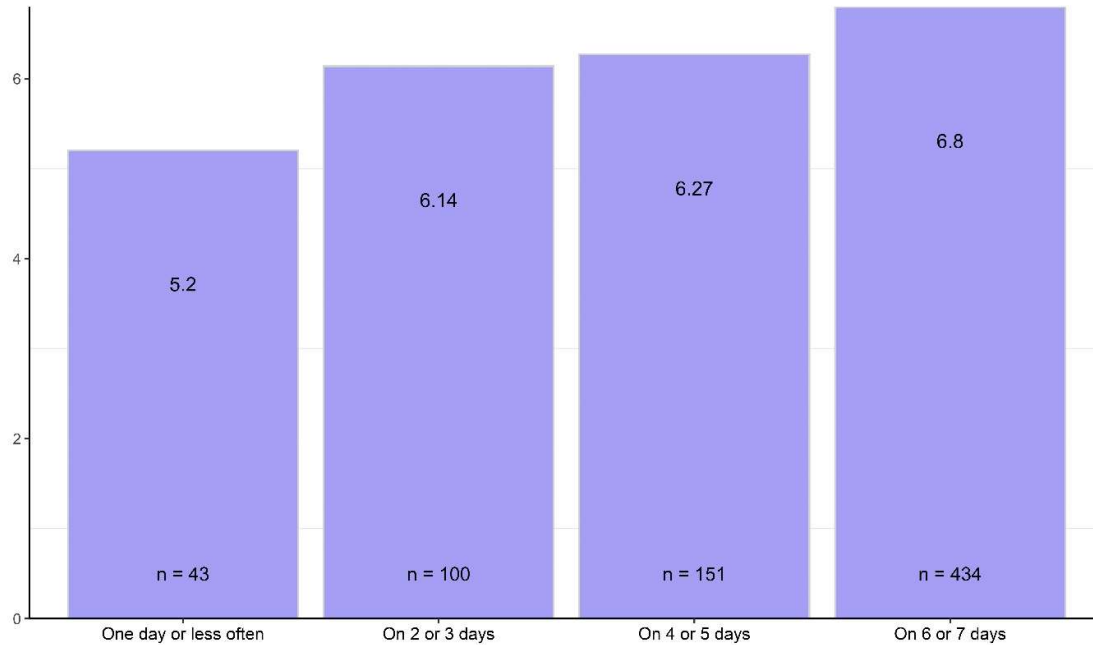
Figure 15 shows an overall increase of 11.6%, between people who have used Paired from 'one week or less' (BPI 6.14) to 'more than 3 months' (BPI 6.85).^{xiii}

Figure 15: Benefits of Paired (BPI) and duration of use



Frequent, regular use of Paired is associated with reporting experiencing greater benefits from using it (Figure 16). Those who used the app on 6 or 7 days per week²⁵ experienced 30.8% greater benefit from using it (BPI 6.80, with a statistically significant difference to the BPI scores of all other groups), compared with those who used it on 'one day or less often' per week (BPI 5.20). Of note, there was no statistically significant difference between the BPI scores of those who used Paired '4 or 5 days' and '2 or 3 days' per week.^{xiv}

Figure 16: Benefits of Paired (BPI) and days used in a typical week



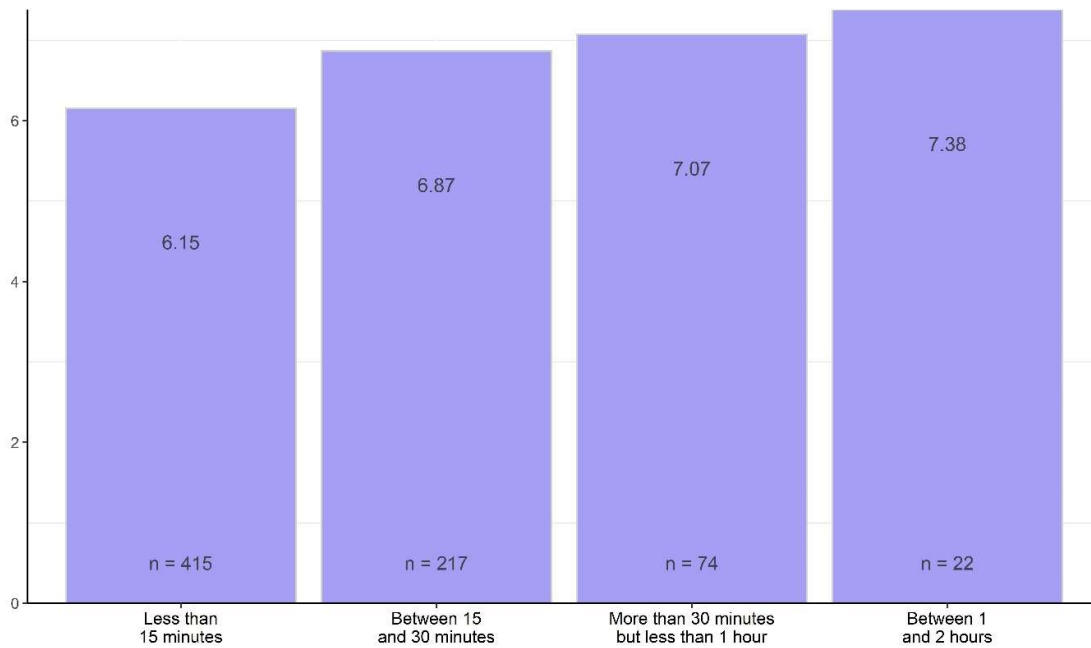
'It has given us a fun little night routine and helps us learn more about each other.'
Female, US, 18-24, heterosexual, living together (survey data)

²⁵ Among those reporting having used Paired for more than one week.

Finally, the intensity of Paired use (total time spent using the app in a typical week²⁶) was also related to the benefits users gained from the app. People who reported spending between one and two hours per week using Paired experienced 20.0% greater benefits from using the app (BPI 7.38), compared with those who used it for less than 15 minutes per week (BPI 6.15).

Although the difference in BPI between people who spent less than 15 minutes per week using Paired, and all the other groups, was statistically significant, other between-group differences were not – meaning that they may be due to chance. This means that we cannot say whether or not there are benefits to be gained from using the app for more than 30 minutes a week.^{xv}

Figure 17: Benefits of Paired (BPI) and total time used in a typical week



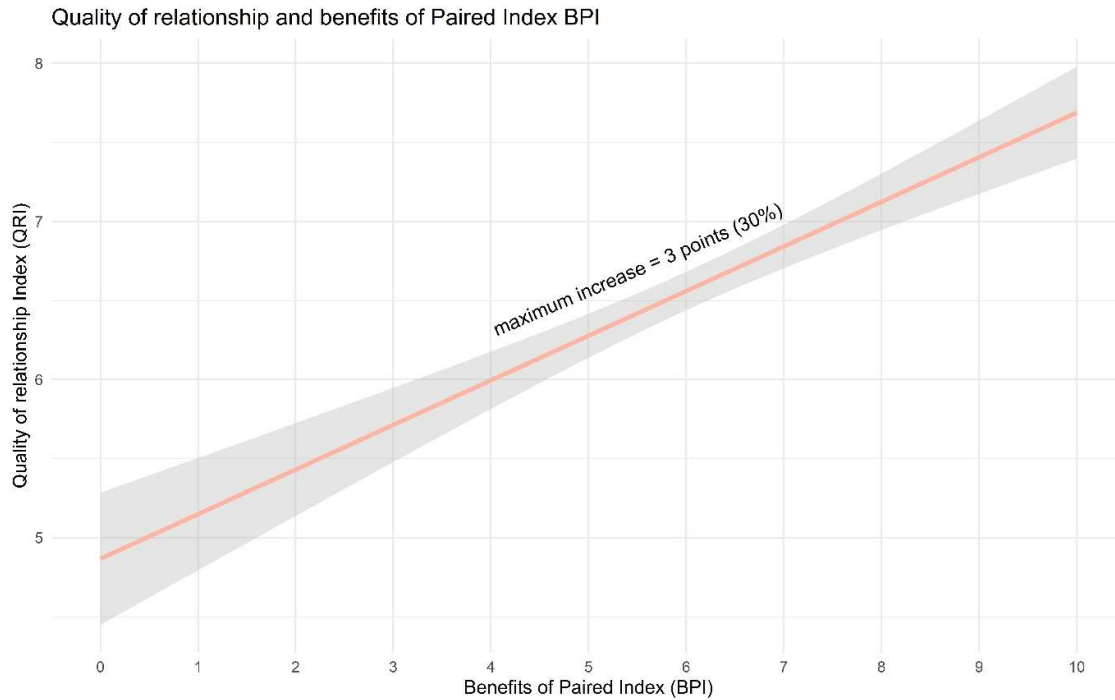
²⁶ Restricted to those who reported having used the app for at least 1 week.

Relationship quality and benefits of Paired

We then explored the statistical association between reporting experiencing benefits from using Paired (as measured by BPI) and quality of relationship (measured by QRI).^{xvi} Figure 18 shows this association; for each point increase in BPI, QRI Increases about 0.3 of a point.

Overall, the more beneficial users find Paired to be, the more likely they are to report higher relationship quality. This strengthens the case that it is usage of Paired which results in improvements in relationship quality.

Figure 18: The association between relationship quality (QRI) and benefits of Paired (BPI)

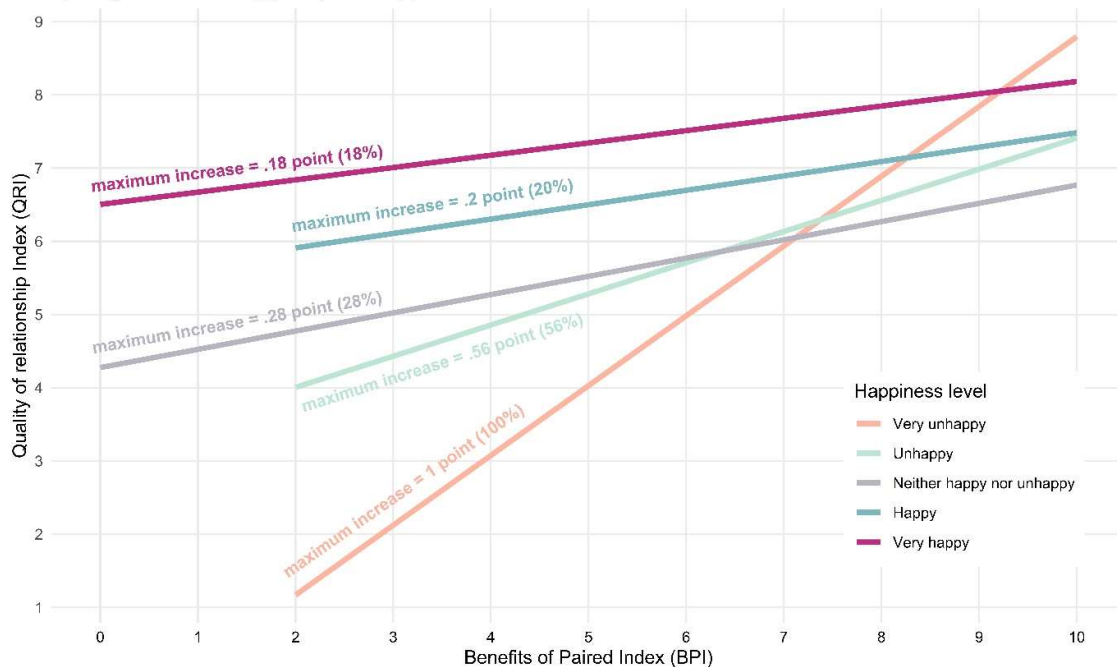


Relationship quality, benefits of Paired, and happiness

Through a further analysis, we found that the relationship between the benefits users experienced from the app (measured by BPI) and their relationship quality (measured by QRI) was influenced by how happy they were (as reported in the survey).^{xvii} Among Paired users who reported that they are 'very unhappy', relationship quality (QRI) increases by about 1 point with each point increase in how beneficial they find Paired to be (BPI). The steepness of the lines decreases steadily the more people progress on the happiness continuum: for 'unhappy' people, relationship quality (QRI) increases by 0.56 points for each point increase in BPI; for those who are 'neither happy nor unhappy' relationship quality (QRI) increases by 0.28 points per point increase in BPI. Lastly, 'happy' and 'very happy' people's relationship quality (QRI) increases by only 0.20 and 0.18 points respectively, per point increase in BPI.

This suggests that the strength of impact of Paired on relationship quality may be less for happy and very happy people, compared to those who are less happy. Although they may perceive Paired to be beneficial, the relationship between perceiving this benefit and relationship quality (i.e. BPI and QRI) is not statistically significant for 'very happy' and 'happy' people. In contrast, for 'very unhappy', 'unhappy' and 'neither happy nor unhappy' people, this relationship is statistically significant, and we can be confident that the more beneficial they find Paired to be, the higher their relationship quality is likely to be. Paired may be particularly beneficial to people who are dissatisfied with their life in general, and from that we could assume are dissatisfied with their relationship.

Figure 19: Relationship quality (QRI) and benefits of Paired (BPI), among Paired users reporting different levels of happiness



Paired users' perceptions: mechanisms of action

Survey participants were asked the extent to which they agreed or disagreed with statements about *how* Paired works; this supplements the analysis in the previous section (p28 onwards) about Paired's impacts on different aspects of relationship quality.

72.0% agreed or strongly agreed that on days when they use the app, they remember to do something for their relationship.²⁷ Interestingly, only 15.0% agreed/strongly agreed that on days when they *do not* use the app, they forget to do something for their relationship.²⁸ Perhaps this reflects that people often do some 'relationship work' often regardless of app use, or alternatively, that use of the app has helped create daily habits that are carried out without the app's prompting.

'[Paired] really has helped start conversations when there wouldn't have been one before. And that's great because especially to conflict adverse people, not that any of them have really started conflict, but they've started mostly helpful conversations. I think what starts the conversation most reliably is the quizzes each week because, oh I felt big smiley face about it, but he only felt medium smiley face about it, why is that?'

Male, US, 25-34, bisexual, living together, no children (interview)

Survey question: How has your relationship changed since using Paired?

'We remember to take time every day to focus on connecting and on growth in our relationship. It brings us closer and we are always learning new things about one another.'

Female, Australia, 18-24, bisexual, cohabiting, no children

'The questions and quizzes have become part of our nightly routine and give us discussion topics.'

Male, Australia, 35-44, heterosexual, living apart, children at home

²⁷ 95% CI: 68.8-75.2%.

²⁸ 95% CI: 12.4-17.6%.

Who uses Paired?

Summary of data sources and methods

To date little has been known about Paired users' characteristics. We compared data from the following sources:

- Aggregate data from Paired, for users who opted to provide their demographics via the app (a recent option, for which there is much missing data; N=5,468, see Appendix, p48).
- Online survey data (n=745, see p49 for further details).

We summarise the findings in general terms, without making statistical comparisons between data from the two different sources. Often, both the aggregate data and the survey data provided similar findings. We only note the source of the data where findings appeared to differ or were measured differently.

Paired users' characteristics²⁹

Paired's users are diverse: by age, gender, sexual orientation, relationship characteristics and parenthood.

Paired's users have an average age of 29 or 30 years (with a standard deviation almost 10 years - indicating a broad spread of ages). Paired is for people aged 18 and older, and users range from this age to beyond retirement age. Three quarters of Paired users are heterosexual, whilst one quarter are LGBTQ+ (based on survey data only).

In terms of relationship characteristics, Paired users are also diverse. Around one-in-three users are married or in a civil partnership/union, and two-thirds are unmarried. Approximately one-third of users are living separately, and two-thirds are cohabiting (living together as a couple). Paired users' relationships range from very new to long-term. Survey data show that around half of users' relationships have lasted between 1 and 5 years (so far), almost 5% of relationships are less than 6 months old and almost 3% have lasted 20 years or more (so far). Data provided to Paired indicate a similarly wide range (and the average year a user's relationship began was 2015 or 2016).

Data on parenthood were gathered differently by the survey and by Paired. Paired's data indicate that almost four-in-ten users have children and almost six-in-ten do not (with a small proportion currently expecting). Survey data indicate that three-in-ten Paired users have a child/children aged under 18 living in their household, whilst seven-in-ten do not (the survey did not provide a 'pregnant/expecting' response option). The lower proportion of 'parents' in the survey compared to the data provided to Paired is likely to reflect that the survey wording specified children aged under 18 who were currently living in the same household as the survey participant, whilst Paired's data would include adult children and children aged under 18 who are living elsewhere.

Both data sources suggest more women than men are using Paired, but we believe this is likely due to women being more likely to participate in research and provide data about their relationships.³⁰ 1.3% survey participants, and 2.3% of people who provided demographic data to Paired, indicated other gender identities such as non-binary.

²⁹ We mention the data source only where there appears to be a difference between the data provided by the survey and that collected by the app. No statistical tests have been run to compare these datasets.

³⁰ This probably reflects that women are somewhat more likely to participate in research than men are. Participation rates by gender in Professor Gabb's *Enduring Love?* study suggest that this may especially be the case for surveys about couple relationships.

Conclusion

Main findings

We observed improvements in relationship quality with longer and more frequent use of Paired. Integration of the findings from our various analyses of different data sources, and the ‘dose-response’ effect we observed, together give us confidence that Paired is responsible for the benefits to relationship quality that its users enjoy.

We developed the Quality of Relationship Index (QRI) to measure relationship quality. We found that among Paired users, communication – the underpinning dimension of all relationship maintenance behaviour – is most strongly related to relationship quality.

We found higher relationship quality (QRI) with longer and more frequent use of Paired. These improvements are substantial, particularly considering the short duration of our evaluation: e.g. 36% increase in relationship quality over approximately 3 months’ use of the app. The total amount of time (per week) spent using the app was associated with perceiving the app to be more beneficial, but time spent on the app had little association with relationship quality. This suggests that it is not necessary to use Paired intensively in order for relationship quality to improve (although people who are particularly enjoying using the app may of course choose to use it for longer periods of time). This suggests that while sustained and daily use of Paired works best for improving relationship quality, it is not necessary to dedicate a lot of time to using the app.

We estimate that people who have 2 to 3 in-app interactions (termed ‘conversations’ by Paired) and who use Paired for one week or more experience a 19.4% increase in relationship quality (QRI); whilst those who have 6 or 7 ‘conversations’ per week experience a 31.1% increase in QRI.

Users whose accounts are linked with their partner’s account experience 44.8% higher relationship quality than those who are unlinked, and having a premium subscription is also associated with greater relationship quality. Linkage enables the in-app interactions (‘conversations’) that are central to the app’s design, whilst premium subscriptions deliver more features and content. Using the app together and paying for a subscription, may also indicate a stronger, shared commitment to relationship improvement.

The findings described above support the hypothesis expressed in our theory of change (p11), that daily notifications and in-app interactions can prompt and facilitate the daily ‘relationship work’ that, over time, sustains and improves couple relationships. Paired users ascribed particular value to the app’s helping them identify relationship strengths, which suggests that this could be included in a theory of change in any future research about Paired.

We explored change over time in different aspects of relationship quality, whilst using Paired. Improvements in couple communication, and dealing with conflict as a couple, were substantial, and survey participants clearly credited Paired with delivering improvements in these areas (and to a greater extent when they used the app for a longer period, and more regularly). Almost all Paired users agreed that they felt emotionally connected to their partners when they first used the app, but the strength of agreement increased over time. A smaller change in how comfortably couples can discuss their sex life with each other may indicate that this issue is difficult to address; or possibly that this particularly sensitive issue is better explored by researchers with individuals, rather than in a quiz where a partner may see the response.

Paired’s users are diverse by age, sexual orientation, relationship characteristics and parenthood, indicating that the app has broad appeal for many types of users, in many types of relationship.

Paired in the current context

Unlike traditional relationship counselling (therapy), use of Paired does not rely on couples being in the same place, or even using the app at the same time. As a digital relationship well-being intervention, Paired appears to be uniquely placed to enhance relationships in the current context: when couples may be dealing with the stresses of Covid-19 and lockdowns or social distancing on couple and family life (including spending much more or much less time together). We will explore this further in analyses of the evaluation's ongoing in-depth interviews.

As lockdowns and other restrictions ease, and couples return to normal (or a 'new normal') it has been predicted that there will be an increase in relationship breakdowns and divorce. The Citizen's Advice Bureau in the UK has reported a 25% surge in online searches for information about divorce, and divorce lawyers report a 30% increase in enquiries. Paired's users are building stronger relationships and the relationship skillset that may equip them to face future changes and challenges with resilience and joy, as we emerge from lockdowns/restrictions over 2021 and beyond.

'I think we've figured out that we have quite a strong relationship. I mean if we haven't killed each other yet over lockdown, then we're not likely to.'

Male, UK 25-34, bisexual, cohabiting, no children (interview)

'[Paired] had a lot of Christmas themed questions, which was nice because it was a very nice joyous time, but also a bit of a stressful time for both of us as well. It was nice to have something to talk about that wasn't stressful, and that was 'little'. Like what is a holiday tradition that you want to do with your kids or something like that. It's not tiny because it's important, but it's also not like 'how are we going to get your mom to respect me with our child?' It's such a big thing. [Paired] is a little more chill.'

Female, US, 18-24, heterosexual, cohabiting, no children (interview)

'I get stir crazy, but generally speaking we've spent the last couple weeks bingeing This is Us instead of going out [...] living together has been much easier, living through the pandemic has been much easier having someone to do it with.'

Male, US, 25-34, bisexual, cohabiting, no children (interview)

Survey question: How has your relationship changed since using Paired?

'We talk alot which is great for us and we have had more laughs which is great for this covid period.'

Male, UK, 25-34, heterosexual, married

Strengths and limitations of the Paired Pilot Evaluation

We conducted the evaluation of Paired as a pilot study, and over a relatively short timeframe. We may therefore underestimate Paired's impacts on relationship quality, which could potentially continue to increase over time, beyond 3 months' use of the app.

Paired reports that 85-90% of active users of Paired are linked with a partner on the app. Encouragingly, survey participants were similarly likely to be linked with their partners on the app, possibly reflecting that the survey invitation was likely to be seen by frequent users of Paired (compared to people who downloaded Paired and then did not use it much). Demographic data, where available, also appeared to be similar. This suggests that our research participants are likely to reflect active users of Paired who are mostly using the app as it was designed, i.e. regularly and with linkage to partners' accounts (which enables Paired's in-app interactions between partners – termed 'conversations' by Paired).

We used multiple methods to collect and analyse data. Integration of the findings obtained via different, complementary methods gives rigour to our research and strengthens the conclusions we draw (the following paragraphs illustrate how the strengths of one method can address the limitations of another).

As explained on p12, we were unable to use experimental research design, although such designs are best suited to establishing definitively whether improved relationship quality is exclusively due to use of Paired. However, our observation that Paired's impact on relationship quality increases with increasing duration of use (in both the in-app quiz data and survey data) highlights a 'dose-response' like effect that supports the effectiveness of Paired. Furthermore, direct questions about Paired's impacts on relationship quality, and on the relationship maintenance behaviours that may help to improve relationship quality, provide further evidence that those improvements can be attributed to use of Paired by users (rather than say any other relationship help-seeking that couples may be engaging in at the same time).

Seasonal effects and Covid-19 may have affected all the data we collected, as our survey and final in-app quiz were deployed at the end of 2020. At this time, couple relationships may have been under particular stresses, because in many countries where Paired has subscribers, Covid-19 control measures affected whether couples could be together with each other, and/or with their friends and family, over the festive period. If there were any negative effects on aspects of relationship at the time of the final in-app quiz (late December/early January), this would lead to an *underestimate* of Paired's potential impact over time – meaning the true impact over three months may be greater than what we observed. The survey was cross-sectional (conducted at one point in time) and so we would not expect to see this effect in this dataset.

Survey participants who have used Paired for longer may be different from new users (e.g. they may be more committed to working on their relationships, compared to new users, some of whom may stop using the app – as apps typically have high attrition). These differences could contribute to the greater relationship quality we observed among survey participants, with increasing duration of use. However, we avoided this limitation in our longitudinal analysis (by examining data from the same individuals at four time points), and we still observed positive changes over time.

We used Paired's quiz function for our research in-app quizzes, and so the responses a user provided to these (and the initial relationship check-up) were available to their partner, if their partner's account was linked to theirs and if they also did the same quiz. This may have affected responses in some way, although it is not clear how. It is unlikely to have affected the change over time that we

observed in these data, as all quizzes would have been affected. It is encouraging that the confidential online survey produced broadly similar findings, and this may suggest that sharing responses with a partner has little effect.

Neither source of data on user characteristics is representative of Paired users, for instance, people who use the app more often will have been more likely to see the survey invitation and may also have been more likely to provide their demographic information to Paired. However, people who provided their demographic information via both sources are perhaps likely to be representative of Paired's *active* users, in whom we are most interested when evaluating Paired's effectiveness.

Future analyses

We will expand on the analyses presented in this preliminary report, over the coming months. For our future academic outputs, we will compare Paired's impact by user characteristics: for instance, different demographics, and different relationship types and durations.

Once our in-depth interviews are completed, we will conduct a detailed analysis of the experience of using Paired, enabling a fuller understanding of the contexts in which people use the app, how they use it and why. This analysis has potential to add depth to our quantitative analyses of the impact of using Paired (for instance further benefits may be identified, which could be explored in future research), and to enhance our understanding of relationships and how they are best supported, in the context of Covid-19.

References

- Amato, P. R., & Keith, B. (1991). Parental divorce and the well-being of children: A meta-analysis. *Psychological Bulletin*, 110, 26-46.
- Bailey JV, Mann S, Wayal S, Abraham C, Murray E. (2015). Digital media interventions for sexual health promotion - opportunities and challenges. *British Medical Journal*, 350:h1099.
- Bazeley, P. (2018). Integrating analyses in mixed methods research. Sage: London/Thousand Oaks/New Delhi/Singapore.
- Catwell L, Sheikh A. (2009). Evaluating eHealth Interventions: The Need for Continuous Systemic Evaluation. *PLoS medicine*, 6(8).
- Cordova, J. V. (2014). *The marriage checkup practitioner's guide: Promoting lifelong relationship health*. American Psychological Association. <https://doi.org/10.1037/14321-000>
- Cugelman, B., Thelwall, M., & Dawes, P. (2011). Online interventions for social marketing health behavior change campaigns: A meta-analysis of psychological architectures and adherence factors. *Journal of Medical Internet Research*, 13(1), 88–112.
- Danaher, J., Nyholm, S., & Earp, B. D. (2018). The quantified relationship. *The American Journal of Bioethics*, 18(2), 3-19.
- DH (2019). The NHS Long Term Plan. Department of Health, UK. Available from: <https://www.longtermplan.nhs.uk/wp-content/uploads/2019/01/nhs-long-term-plan.pdf>
- Gabb, J. & Aicken, C. (2020). Summary report: Covid-19 Relationships survey. Commissioned by The Open University and Paired. Available from: <http://www.open.ac.uk/researchprojects/enduringlove/paired>
- Gabb, J. & Fink, J. (2015). Couple Relationships in the 21st Century. Research, Policy, Practice. Basingstoke: Palgrave Macmillan.
- Gabb, J. et al. Enduring love? (2021). <http://www.open.ac.uk/researchprojects/enduringlove/> (accessed 12/03/2021).
- Garriga, A. & Kiernan, K. (2013). Parents' relationship quality, mother-child relations and children's behaviour problems: Evidence from the UK millennium cohort study. Working Paper.
- GVR (2021). mHealth Apps Market Size, Share & Trends Analysis Report By Type (Fitness, Medical), By Region (North America, APAC, Europe, MEA, Latin America), And Segment Forecasts, 2021 – 2028 <https://www.grandviewresearch.com/industry-analysis/mhealth-app-market>
- Heather, B., (2018). 'Self-care apps likely among long-term plan's top digital priorities', Health Service Journal. <https://www.hsj.co.uk/technology-and-innovation/self-care-apps-likely-among-long-term-plans-top-digital-priorities/7024071.article>
- Holbrook AM, Thabane L, Shcherbatykh IY, O'Reilly D. (2006). E-health interventions as complex interventions: improving the quality of methods of assessment. AMIA Annual Symposium Proceedings. 952.
- IQVIA Institute (2017). The Growing Value of Digital Health. Evidence and Impact on Human Health and the Healthcare System Institute Report <https://www.iqvia.com/insights/the-iqvia-institute/reports/the-growing-value-of-digital-health>

- Lucier-Greer, M., Birney, A., Gutierrez, T., & Adler-Baeder, F. (2018). Enhancing relationship skills and couple functioning with mobile technology: An evaluation of the Love Every Day mobile intervention. *Journal of Family Social Work*, 21, 152-171.
- Lilford R.J., Foster J., Pringle M. (2009). Evaluating eHealth: How to Make Evaluation More Methodologically Robust. *PLoS medicine*, 6(11).
- MRC (Craig P, Dieppe P, Macintyre S, Michie S, Nazareth I, Petticrew M) (2008). Developing and evaluating complex interventions. London: Medical Research Council. Available from: <https://mrc.ukri.org/documents/pdf/developing-and-evaluating-complex-interventions/>
- Nielsen (2018) Report on International Practice On Digital Apps. The Digital Health & Care Institute.
- O’Cathain, A. & Thomas, K.J. (2004). ‘Any other comments?’ Open questions on questionnaires – a bane or bonus to research? *BMC Medical Research Methodology*, 4(25).
- ONS. (2018). Marriages in England and Wales: 2015. Statistical bulletin, <https://www.ons.gov.uk/peoplepopulationandcommunity/birthsdeathsandmarriages/marriagecohabitationandcivilpartnerships/bulletins/marriagesinenglandandwalesprovisional/2015>
- Proulx, C., Helms, H., & Buehler, C. (2007). Marital quality and personal well-being: A meta-analysis. *Journal of Marriage and Family*, 69(3), 576-593.
- Richards, D., & Richardson, T. (2012). Computer-based psychological treatments for depression: a systematic review and meta-analysis. *Clinical psychology review*, 32(4), 329-342.
- Robles R., Slatcher R., Tombello J. & McGinn, M. (2014). Marital quality and health: A meta-analytic review. *Psychological Bulletin*, 140, 140-148.
- Sserwanja I. & Marjoribanks D. (2016). Relationship distress monitor. Estimating levels of adult couple distress across the UK. London: Relate (Research Report). Available from: https://www.relate.org.uk/sites/default/files/relationship_distress_monitor_0.pdf
- Webb, T. L., Joseph, J., Yardley, L., & Michie, S. (2010). Using the internet to promote health behavior change: A systematic review and meta-analysis of the impact of theoretical basis, use of behavior change techniques, and mode of delivery on efficacy. *Journal of Medical Internet Research*, 12(1), 97–114.
- Whisman, M. A. (Ed.). (2008). Adapting cognitive therapy for depression: Managing complexity and comorbidity. New York: Guilford.
- WPR, World Population Review 2021 [Divorce Rate by State 2021 \(worldpopulationreview.com\)](https://worldpopulationreview.com)

References to R (statistical software) packages:

Fox, J., Friendly, G. G., Graves, S., Heiberger, R., Monette, G., Nilsson, H., ... & Suggests, M. A. S. S. (2007). The car package. *R Foundation for Statistical Computing*. Retrieved from <http://ftp.uni-bayreuth.de/math/statlib/R/CRAN/doc/packages/car.pdf>

Kohl, M., & Kohl, M. M. (2020). Package 'MKinfer'. Retrieved from: <https://cran.rstudio.org/web/packages/MKinfer/MKinfer.pdf>

Patil, I. (2018). ggstatsplot: 'ggplot2' Based Plots with Statistical Details. Retrieved from: <https://cran.r-project.org/web/packages/ggstatsplot/index.html>

Rosseel, Y. (2012). Lavaan: An R package for structural equation modeling and more. Version 0.5–12 (BETA). *Journal of statistical software*, 48(2), 1-36.

Slowikowski, K., Schep, A., Hughes, S., Lukauskas, S., Irisson, J. O., Kamvar, Z. N., ... & Slowikowski, M. K. (2016). Package 'ggrepel'. Retrieved from: <https://brieger.esalq.usp.br/CRAN/web/packages/ggrepel/ggrepel.pdf>

Team, R. C., Bivand, R., Carey, V. J., DebRoy, S., Eglen, S., Guha, R., ... & Pfaff, B. (2020). Package 'foreign'. Retrieved from: <https://cran.rapporter.net/web/packages/foreign/foreign.pdf>

Wickham, H. (2011). ggplot2. *Wiley Interdisciplinary Reviews: Computational Statistics*, 3(2), 180-185.

Wickham, H., Francois, R., Henry, L., & Müller, K. (2015). dplyr: A Grammar of Data Manipulation. R package version 0.4. 3. Retrieved from: <https://dplyr.tidyverse.org/>

Appendices

Appendix 1: Paired as a complex digital intervention

Complex interventions (MRC, 2008) have multiple components, or multiple ways in which they may change people's behaviours and attitudes. By nature digital interventions are particularly complex because they involve users interacting with technology (the app, their phone) (Holbrook et al., 2006). For Paired, this that there are different ways in which its users may experience the app, with implications for its impact on relationship quality. We can explore these 'mechanisms of action' through evaluation research.

Complex interventions can be different for different people (unlike a leaflet or non-interactive website). For example, Paired is different depending on whether a user's account is linked with their partner's or not, and whether they have a free or premium subscription; and within these constraints, they can choose which content to access and which features to engage with. Because Paired enables in-app interactions with partners, it is also experienced differently depending whether and how a user's partner is engaging with the app. Finally, Paired users may use the app over different durations, every day or less often, and for different amounts of time. All of these may affect Paired's impact, and, as far as is feasible, accounted for in its evaluation.

Appendix 2: Detailed data collection tools, methods and samples

Our study is a pilot evaluation, and at the outset we did not know what the uptake of the in-app quiz or online survey would be. Instead, the response rate was something we sought to find out from the research. Therefore, we conducted no power calculations and set no target sample size (i.e. number of participants) for the in-app quiz or survey.

Table 1 summarises the data collected from each source.

Table 1: Summary of main data gained from each data source

Data source	User demographics	Relationship quality	Perceived benefits of using Paired	Paired usage: 'Dosage' (e.g. duration, frequency of use); free/premium subscription; linked/unlinked; 'growth areas' engaged with
In-app quiz (quantitative)	Yes – but lots of missing data	Yes – measured longitudinally (over 3 months)	No	Yes (recorded by app)
Online survey (quantitative and qualitative)	Yes	Yes – measured cross-sectionally (at one point in time)	Yes	Yes (self-reported)
In-depth interviews (qualitative)	(n/a, purposive sample)	Yes	Yes	Yes (self-reported)
Aggregate data provided by Paired	Yes - but lots of missing data	No	No	Yes - % linked/unlinked

(1) In-app quiz (monthly check-in) statements, and initial relationship check-up statements

As part of the Paired evaluation, researchers collected data from Paired users using the in-app quiz function (this research data collection was termed a ‘monthly check-in’). The research in-app quiz was run on three occasions, at monthly intervals (30th October, 30th November, 30th December). It took the place of a weekly quiz that Paired runs with its users on a variety of topics, in which users’ responses are shared with partners (if the partner also completes the same quiz). Our in-app quiz was clearly identified as research (i.e. part of the Paired Evaluation, a study run by university researchers). Paired provided researchers with a de-identified data extract for everyone who had completed at least one research in-app quiz, containing their app usage data. (By ‘de-identified’ we mean that there was no way that the researchers could identify people whose data was in the data extract, and dummy IDs so that researchers did not see people’s real Paired user account IDs).

This comprised five statements to which users could agree/disagree on a five-point Likert scale. Four of these statements (provided in full in Table 2) concerned four aspects of relationship quality reflected in the ‘growth areas’ that Paired addresses:

- communication,
- dealing with conflict,
- emotional connection,
- sex and intimacy.

The fifth statement, ‘Paired is improving how we communicate as a couple’, was not used in our analyses as we considered it overlapped with the first statement on communication.

We obtained de-identified app usage data from Paired, for users who had completed one or more in-app quizzes. This included data from the Relationship Check-up which Paired users are asked to complete when they first start using the app, comprising nine statements to which users agree/disagree on a 5-point Likert scale. Four of these statements correspond to four of the statements from the in-app quiz, and so the Relationship Check-up effectively provided baseline data for our analyses. Table 2 compares the wording of statements in these two data sources.

Table 2: Comparison of wording: relationship check-up and research in-app quiz statements

Area of relationship quality	‘Relationship Check-up’ statement	In-app quiz statement
Communication	I am very satisfied with how we communicate with each other	We communicate openly with each other
Dealing with conflict	We are able to discuss and resolve conflict (<i>identical wording</i>)	
Emotional connection	I feel connected with my partner emotionally	We enjoy a positive emotional connection
Sex and intimacy	We are comfortable discussing our sex life	We are comfortable discussing our sex life with each other

Research in-app quizzes remained available to Paired users on the app, and so although many people completed them when they were first available, there was variation in completion dates. Over small timeframes (e.g. a few days) we would not expect to detect a change in relationship quality. We dealt with this by restricting the sample we analysed (as described below).

Data management

In the data extract provided to researchers, for additional data security, Paired replaced users' ID number with a dummy ID, and dates of birth (where available) were replaced with ages in complete years at 31st December 2020.

Data in Excel were restructured to match each case with a dummy ID with its corresponding variables of interest. Variables for analysis were extracted from two types of quiz, namely the three monthly check-in in-app quizzes and the initial relationship check-up quiz.

Most people who completed all three in-app quizzes completed the relationship check-up quiz between October 2020 and the beginning of November 2020. We used this time as the baseline level of people's quality of relationship when they started using Paired.

In-app quiz respondents and sample analysed

A convenience sample of 3717 people completed at least one research in-app quiz by early January 2021. We restricted the sample we analysed to the 440 people who:

- completed all three research in-app quizzes; *and*
- completed the initial 'relationship check-up' in October or later (which we could use as a fourth data collection point, as it included similar statements to our own quiz); *and*
- had intervals of at least 7 days between the relationship check-up and each in-app quiz.

Table 3: Characteristics of in-app quiz participants and Paired users (based on information provided by Paired)

		In-app quiz participants: sample analysed	Users providing data to Paired
		<i>n=440</i>	<i>n=5,468</i>
Demographics			
Age, years	<i>Mean (SD)</i>	<i>31.1 (10)</i>	<i>29.6 (9.1)</i>
Gender	Female	65.4%	62.8%
	Male	32.9%	35.0%
	Gender queer/non-binary	1.7%	2.0%
	Other	0.0%	0.3%
Children?	Yes	41.4%	38.7%
	No	56.1%	58.7%
	Expecting	2.5%	2.6%
Relationship characteristics			
Living with partner?	Yes	63.4%	66.4%
	No	36.6%	33.6%
Marital status	Unmarried	62.3%	61.3%
	Married	31.2%	29.4%
	Civil partnership	6.5%	9.4%
Relationship duration	'Average' year started	2015-2016	2015-2016
	Range	1973-2021	1965-2021 ³¹
	Standard deviation	6.8 years	6.0 years
Paired usage			
Subscription	Free	80.8%	*
	Premium	19.2%	*

³¹ Data were captured in early January 2021.

Linked with partner, on Paired?	Yes	89.9%	85-90%**
	No	10.1%	10-15%**

*Commercially sensitive; data unavailable. **Proportion of 'active users' who are linked with a partner on Paired.

Paired users can provide their demographic data and relationship characteristics (alongside which topics they are particularly interested in). This is a recent, optional feature, and so the data are incomplete. Table 3 presents the characteristics of the analysed sample of in-app quiz participants, alongside the available data on all Paired users: demographics and relationship characteristics provided to Paired by just 5468 users; and the percentage of all users linked to their partner.

Characteristics of the in-app quiz participants sample are, upon visual inspection, similar to the available data from Paired. We have not tested whether any apparent differences are statistically significant; we recognise that the incomplete demographic and relationship characteristics data from Paired imperfectly reflect the characteristics of all Paired users (or all active users of Paired).

(2) Online survey

The Paired Evaluation's 30-item online survey was promoted via an in-app message, over three 24-hour periods during 15th-30th December 2020 (15th/16th, 22nd/23rd and 29th/30th December – dates depended on users' time-zones as Paired is a global app). This message invited Paired users to contribute to academic research about Paired and relationships by following a link to the Paired Evaluation Survey. The survey was hosted on the secure JISC Online Surveys platform (i.e. outside of the app). The front page of the survey provided information about the study, and invited people to indicate their informed consent to survey participation. The survey was only accessible to people who indicated consent, and responses were only recorded for those participants who completed the survey.

Survey participants were invited to provide their email address for two separate purposes (a) entry into a prize draw to win a £100 voucher (one winner was randomly selected); (b) participation in a qualitative interview (see below).

The survey is provided on the following pages.



Paired evaluation survey

The **Paired Evaluation Study** aims to explore Paired's impact on relationship quality. It's being run by the Open University and the University of Brighton.

This survey asks about your relationship quality - focusing on communication, dealing with conflict, emotional connection, and sexual intimacy - and factors that may be impacting on your relationship with your partner. It will examine the effectiveness of Paired in prompting routine relationship interactions, and the growth areas that you and your partner have been working on.

Completing this survey takes around **10-15 minutes**. If you complete the survey, you will be eligible to enter a prize draw to win a **£100 Amazon voucher** (or equivalent value in your currency).

The Open University's *Enduring Love?* website provides further [information about the Paired Evaluation](#) and answers to [frequently asked questions \(FAQs\)](#).

Informed consent

If you complete this online survey then you are giving your consent for your responses to be used in the Paired Evaluation Study. You can withdraw from the research by not finishing the survey. Your responses will only be included in the project dataset if you reach the end of the survey. Your rights to anonymity and confidentiality will be respected (to read the Privacy Notice, please click or tap on 'more info', below).

 [More info](#)

☐ I agree to participate in this study and I give consent for the information that I provide to be used anonymously in reports and other outputs.

About You

What is your gender?

- ☐ Female
- ☐ Male
- ☐ Other

Please specify:

How old are you? *Please enter your age in years*

Which country do you live in?

What is your sexual orientation?

- ☐ Heterosexual (straight)
- ☐ Gay/lesbian
- ☐ Bisexual
- ☐ Other

Please specify:

What is your current employment status? *(Select as many as apply)*

- ☐ Working/employed full-time
- ☐ Working/employed part-time
- ☐ On a government-sponsored training scheme (e.g. apprenticeship)
- ☐ Self-employed or freelance
- ☐ Doing any other kind of paid work
- ☐ In full-time education
- ☐ Away from work (e.g. sick leave, maternity/parental leave, temporarily laid off, furloughed)
- ☐ Unemployed
- ☐ Full-time caring responsibilities
- ☐ Other

Please specify:

About Your Relationship

How long have you been in your current relationship?

- ☐ Less than 6 months
- ☐ Between 6 months and 1 year
- ☐ 1 to 5 years
- ☐ 6 to 10 years
- ☐ 11 to 15 years
- ☐ 16 to 20 years
- ☐ More than 20 years
- ☐ Not sure / can't remember

How would you describe your current relationship?

- ☐ Casual relationship, not living together
- ☐ Steady relationship, but not living together
- ☐ Cohabiting (living together as a couple)
- ☐ Civil partnership/union
- ☐ Married
- ☐ Other

Please specify:

Are there any children (aged under 18 years) living in your household? *Please select 'yes' if the child/children live with you for at least 3 days a week*

- ☐ Yes, one or more children
- ☐ No

How many children live in your household?

What are their ages?

Relationship advice and support before using Paired

Before you started using Paired, which of the following sources of **relationship advice and support** had you used? *This could be for your current relationship, or a previous relationship.*

- ☐ None - I have never sought relationship advice or support
- ☐ Friend(s)
- ☐ Family member(s)
- ☐ Therapist or counsellor
- ☐ GP / physician
- ☐ Religious leader
- ☐ Internet forum or help site
- ☐ Internet search engine (e.g. google, etc.)
- ☐ Mobile app
- ☐ Other

Please specify:

You and Your Relationship: how you are feeling right now

Please take a few moments to think about the following questions, and select the answers which describe best how you are feeling

How happy or unhappy are you with your **life**, overall?

- ☐ Very happy
- ☐ Happy
- ☐ Neither happy nor unhappy
- ☐ Unhappy
- ☐ Very unhappy

How happy or unhappy are you with your **relationship**, overall?

- ☐ Very happy
- ☐ Happy
- ☐ Neither happy nor unhappy
- ☐ Unhappy
- ☐ Very unhappy

How happy or unhappy are you with your **partner**, overall?

- ☐ Very happy
- ☐ Happy
- ☐ Neither happy nor unhappy
- ☐ Unhappy
- ☐ Very unhappy

8 / 24

[Page 9 of the survey pdf generated by JISC Online Surveys is blank so is not included here. There were no blank pages in the online version of the survey.]

You and Your Relationship in 2020

Which **three** things have had the biggest impact on your **relationship** in 2020?

*Please tell us about events and circumstances which affected your relationship this year, whether the impact was **positive** or **negative**.*

1.

2.

3.

Please explain your answers

10 / 24

11 / 24

You and Your Relationship in 2020

Thinking about 2020 so far:

What has made it **easier** for you, as a couple?

What has made it **more difficult** for you, as a couple?

You and Your Partner

Thinking about your relationship with your partner, in general, do you agree or disagree with the following statements?

Communication

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
We communicate openly with each other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We make time in our daily routine for talking together	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We talk to each other about everything	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My partner understands my non-verbal communication	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

You and Your Partner

Dealing with conflict

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
We are able to discuss and resolve conflict	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We can agree to disagree	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We argue over money	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Dealing with difficult issues together makes our relationship stronger	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

You and Your Partner

Feeling connected

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
We enjoy a positive emotional connection	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My partner is usually aware of my needs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We are always there for each other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We know each other well	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

You and Your Partner

Sex and intimacy

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
We are comfortable discussing our sex life with each other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Sex is an important part of our relationship	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We are physically affectionate with each other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
My partner regularly gives me a hug	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

The Paired app and you

Thinking about the Paired app, do you agree or disagree with the following statements?
(If a statement does not apply to you or your relationship, please skip to the next statement)

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
Paired is improving how we communicate as a couple	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Paired has helped us to resolve issues in our relationship	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Our relationship feels stronger since we've been using Paired	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Paired has helped me to identify strengths in our relationship	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Paired has helped me to identify problems in our relationship	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
On days when I use Paired, I remember to do something for my relationship	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
On days when I don't use Paired, I forget to do something for my relationship	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

17 / 24

The longer I use Paired, the better my relationship gets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Without Paired, I think we may have split up	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

The Paired app and you

Since using Paired, which growth areas have you worked on most? *Please select up to three*

- ☐ Communication
- ☐ Conflict
- ☐ Money and finances
- ☐ Home and work
- ☐ Sex and intimacy
- ☐ Meaning and growth
- ☐ Connection
- ☐ Fun and excitement
- ☐ Family and friends
- ☐ Other

Please specify:

How did Paired help you in these areas?

How has your relationship changed since using Paired?

--	--

How has Paired impacted on your mental health and well-being?

--	--

Using Paired

Are you using Paired as a premium or free subscriber?

- ☐ Free
- ☐ Premium

Are you linked with your partner on Paired?

- ☐ Yes, we're linked on Paired
- ☐ No, I'm not linked with my partner on Paired

For how long have you been using Paired?

- ☐ One week or less
- ☐ More than 1 week but less than 1 month
- ☐ 1 to 3 months
- ☐ More than 3 months

In the last 7 days, on how many days have you used Paired?

- ☐ On 1 day only
- ☐ On 2 or 3 days
- ☐ On 4 or 5 days
- ☐ On 6 or 7 days

In a typical week, on how many days do you use Paired?

- ☐ One day or less often

21 / 24

- ☐ On 2 or 3 days
- ☐ On 4 or 5 days
- ☐ On 6 or 7 days

In the last 7 days, how much time did you spend using Paired?

- ☐ Less than 15 minutes
- ☐ Between 15 and 30 minutes
- ☐ More than 30 minutes but less than an hour
- ☐ Between 1 and 2 hours
- ☐ More than 2 hours

In a typical **week**, how much time do you spend using Paired?

- ☐ Less than 15 minutes
- ☐ Between 15 and 30 minutes
- ☐ More than 30 minutes but less than an hour
- ☐ Between one and two hours
- ☐ More than two hours

Thank you! ...optional interview and prize draw

Would you be willing to take part in a **research interview**, as part of the Paired Evaluation Study? If so, please provide your email address here:

*The interview will take place **online**, and will take approximately **30-45 minutes**. All interviewees will receive a **£20 (or equivalent value)** Amazon gift voucher as a thank you for their time.*

We are aiming to interview 20 people, representing diversity (i.e. people of different ages and genders, people in new and long-term relationships, people with and without children). If you are selected, a researcher from the Open University or the University of Brighton will be in touch within the next couple of weeks. We'll provide further information and arrange a convenient time to talk. If you change your mind about taking part in the interview, it is fine to say no.

Please provide your email address here if you would like to enter the **prize draw** for a £100 Amazon voucher (or equivalent value in your currency)

Your email address (if you provided it) will be stored securely and separately from your survey data. It will only be used for the purposes described above.

Thank you for helping the Paired Evaluation Study!

By taking part, you have helped us to understand how Paired works, and helped to advance knowledge on how to support and improve couple relationships.

To find out more the Paired Evaluation Study and the Open University's research on couple relationships and intimacy, please click [here](#).

We plan to update the website with a summary report of this survey's findings, in time for Valentine's day!

Survey participants

A convenience sample of 745 Paired users completed the survey. Characteristics of survey participants are summarised in Table 4. We have not tested whether any apparent differences between women and men are statistically significant (i.e. they may be due to chance). 500 (67.1%) survey participants were women and 235 (31.5%) were men,³² whilst 10 people (1.3%) identified as other genders, such as non-binary. Their ages ranged from 18 to 69 years.

The data in the below suggest that Paired users are diverse: by age, sexual orientation, relationship duration and type (including cohabitation/non-cohabitation), and whether they have children living in their household.

Table 4: Characteristics of survey participants

	Women, %	Men, %	All participants ³³ , %
<i>Denominator</i>	<i>500</i>	<i>235</i>	<i>745</i>
Demographics			
Age, years			
<i>Mean (standard deviation, SD)</i>	<i>28.1 (8.5)</i>	<i>33.3 (10.8)</i>	<i>29.7 (9.6)</i>
18-24	43.2%	23.8%	37.1%
25-34	37.2%	37.4%	37.4%
35-44	13.6%	23.8%	16.8%
45-54	4.2%	10.2%	6.0%
55+	1.8%	4.7%	2.7%
Sexual orientation			
Heterosexual	70.3%	86.3%	74.3%
LGBQ+, of which:	29.7%	13.7%	25.7%
Gay/lesbian	4.6%	4.3%	5.1%
Bisexual	22.8%	8.1%	18.1%
Other	2.2%	1.3%	2.4%
Country of residence			
UK	37.7%	29.9%	34.9%
US	45.5%	42.3%	44.8%
Other countries	16.8%	27.8%	20.3%
Employment status (<i>participants could select more than one response</i>)			
Working/employed full-time	48.2%	64.7%	53.1%
Working/employed part-time	16.2%	11.9%	14.9%
On a government-sponsored training scheme (e.g. apprenticeship)	0.4%	1.3%	0.7%
Self-employed or freelance	8.8%	12.8%	10.6%
Doing any other kind of paid work	1.8%	1.3%	1.7%

³² This probably reflects that women are somewhat more likely to participate in research than men are. Participation rates by gender in Prof. Jacqui Gabb's *Enduring Love?* study suggest that this may especially be the case for surveys about couple relationships.

³³ n=11 participants responded that their gender was neither male nor female (n=10), or did not respond to this question (n=1). The number is too small for meaningful analysis as a separate category, but these participants are included in the final column of the table.

In full-time education	18.0%	11.5%	15.8%
Away from work (e.g. sick leave, maternity/parental leave, temporarily laid off, furloughed)	7.0%	1.3%	5.5%
Unemployed	9.4%	3.8%	7.6%
Full-time caring responsibilities	5.2%	-	3.5%
Other	2.6%	4.3%	3.4%
Relationship characteristics			
Relationship duration			
>6 months	5.6%	3.0%	4.7%
6 months to 1 year	15.4%	16.2%	15.6%
1 to 5 years	53.4%	41.0%	50.1%
6 to 10 years	14.4%	19.7%	15.8%
11 to 15 years	7.2%	9.0%	7.7%
16 to 20 years	2.0%	6.4%	3.4%
More than 20 years	2.0%	4.7%	2.8%
Relationship type			
Casual relationship, not living together	1.4%	1.7%	1.5%
Steady relationship, not living together	33.6%	32.3%	33.0%
Cohabiting (living together as a couple)	34.6%	20.9%	30.7%
Civil partnership/union	1.4%	1.3%	1.3%
Married	27.2%	43.0%	32.0%
Other	1.8%	0.9%	1.5%
Presence of children in the household (aged under 18)			
Yes, 1+ children	30.2%	29.1%	29.7%
No	69.8%	70.9%	70.3%
Paired usage			
Subscription			
Free	81.4%	79.8%	81.1%
Premium	18.6%	20.2%	18.9%
Linked with partner, on Paired?			
Yes	96.8%	97.0%	96.9%
No	3.2%	3.0%	3.1%
Duration of use of Paired			
One week or less	1.2%	3.0%	1.7%
More than one week but less than one month	28.4%	31.8%	29.2%
1-3 months	56.4%	51.5%	55.1%
More than 3 months	14.0%	13.7%	14.0%

Frequency of Paired use in a typical week (<i>asked of people who had used Paired for more than a week</i>)			
One day or less often	6.9%	4.0%	6.0%
On 2 or 3 days	15.0%	10.6%	13.7%
On 4 or 5 days	19.7%	23.0%	20.7%
On 6 or 7 days	58.4%	62.4%	59.6%

Survey participants appear to be more likely to be linked with their partners on the app, compared to all Paired users (based on visual inspection of the data, and see Table 3, p48). This may reflect that the survey invitation and link on the app was more likely be seen by frequent users of the app; survey participants may therefore be more representative of ‘active users’ of the app than they are of all users.

In Table 4 we have not tested whether differences between men and women in our sample of online survey participants are statistically significant (i.e. differences may be due to chance).

(3) In-depth interviews

For the in-depth interviews, we are sampling from among online survey participants who had agreed to be contacted for a research interview and provided an email address for this purpose. These people were contacted from January 2021 onwards, and are being interviewed online. We are using a purposive sampling strategy (based on data provided in the survey), with gender (treated as binary, i.e. female/male) and country (UK/US – the main countries where Paired has subscribers) as primary sampling characteristics, and a target of 20 interviews. Interviews are ongoing at the time of completion of this report.

In-depth Interview Topic Guide

Checklist

- Check participant comfortable, quiet, secure location
- Check time available
- Agree procedure on breaks, connectivity issues
- Consent documented
- Reiterate anonymity – nothing you say to me will be linked back to you
- Final questions?

Informal interview, interested in your experiences... two broad sections (about you and your relationship, and then about Paired specifically)

About you and your relationship

- Tell me a bit about your relationship
 - Probes: Find out a little about the participant and their partner, their relationship type/duration, cohabiting or not, children? *[to cross check with survey info especially since some details may have changed since December]*

Relationship quality and wellbeing

'Relationship quality' includes communication, connection, ability to manage conflict, and physical intimacy. In an everyday sense, these work as relationship maintenance behaviours that sustain the partnership

- How have the last few months been, for your relationship?
 - Probe: good things, bad things? Ambivalence?
 - Probe specifically about covid-related restrictions and other impacts (e.g. furlough, home-working, lockdown, quarantine if applicable)
- In terms of your own wellbeing, how have the last few months been?
 - Probe: good things, bad things? Ambivalence?
 - Probe specifically about covid-related restrictions and other impacts (e.g. furlough, home-working, lockdown if applicable)

Seeking support, advice and help with couple relationships

- Before using Paired, had you ever sought advice or help for any difficulties in relationships?
 - Probe: for current relationship? For any previous relationships?
 - Couple counselling / relationship counselling/therapy
 - Lay help-seeking – e.g. via friends, family, religious institutions
 - Websites, online forums, self-help books
 - Other apps
 - Reasons? Type of help received? Experience?
- And had you ever sought advice or help to support or improve the quality of your relationship?
 - Probe: for current relationship? For any previous relationships?
 - From people (e.g. friends, family, counsellor)
 - From other sources (e.g. online, self-help books, apps)
 - Reasons? Type of help received? Experience?

Using Paired

- How/why did you start using Paired?
 - Probe: How long for?
 - Probe: Feelings about / reasons for engaging with an app vs. a person, for relationship support, circumstances of use; pros, cons
 - Probe: How do you feel when you use Paired? How has that changed over time?
 - Probe: Have you subscribed to the Premium? Can you talk me through how you decided that?
- What sort of changes have happened in your relationship since you started using Paired?
 - What sort of changes?
 - Changes ascribed to Paired – gradual, instant, step-wise, not yet?
 - Other circumstances & their impact on relationship
- Can you tell me more about how Paired has made a difference to your relationship?
 - Can you tell me about a time that Paired made a difference to your relationship?
 - Probes:
 - As a reminder to do regular 'relationship work'
 - As a way of facilitating/prompting communication with your partner
 - As a way of fostering connection
 - As a way of managing conflict

- As a way of enabling you and your partner to talk about sex and generate in a closer sense of intimacy
 - Advice from relationship experts
 - Content on specific topics – which?
- What do you like about it? Can you give me an example of what that means for you?
 - Anything you are not so keen on? Can you give me an example of what that means for you?

‘Dailyness’

- How often do you use it? Can you talk me through how often you use it
 - Any change over time, reason?
 - Effectiveness
- Where and when do you tend to use it?
 - Probes: Where are you, what else are you doing, routines and rituals?

Communication

- Has Paired changed how you communicate with your partner?
- How has Paired changed how you communicate with your partner?
- Can you tell me about time Paired made a difference to your communication?

Paired content and topics (‘Growth areas’)

- What content/features do you engage with? Why these?
- Which topics (‘growth areas’) have you looked at? Which do you find most helpful? In what ways?

Supporting the relationship

- Thinking broadly now, how (else) could Paired help your relationship?
 - Probe: Is there something else you’re intending to look at in the app, but have not yet had the chance?
 - Is there new content/features that you would like to see in future?
 - Bear in mind they may mention something that Paired already deals with – e.g. something covered by a course (as not many people have engaged with this content, or they might mention something available only to premium users)

Sum up question

- Would you recommend Paired to others? If so, who would it best be suited to?
- What else would you like to tell me about Paired?

Thank you

Confirm email address to send voucher

Appendix 3: Technical appendix

This appendix provides detail on statistical methods and detailed results of statistical tests.

Quantitative data were exported to IBM SPSS version 26 and R software for descriptive and inferential statistical analysis, and data visualisation.

We used SPSS for the initial descriptive analysis and used the chi-square test statistic to determine whether differences between binary categorical variables were statistically significant.

We used R for inferential statistics. We used the package lavaan for confirmatory factor analysis and structural equation modelling.

ⁱ List of R packages used:

foreign = to read SPSS datasets

lavaan = to implement CFA and Structural Equation Modelling

semTools = for additional statistics (e.g., Reliability and validity indexes)

ggplot2 = to build graphs

dplyr = to create subgroups and filter variables

ggrepel = to add labels to graphs

car = to run statistical tests (e.g., ANOVA, t-test)

MKinfer = to run permutation t-tests

rstatix = for additional statistical tests (e.g., ANOVA with Welch approximation)

statsExpressions = to generate effect sizes (e.g., Cohen's d, partial omega squared)

ⁱⁱ **Development of the Quality of Relationship Index (QRI):** The survey included 16 statements addressing four aspects of relationship quality (including 4 statements matching those in the in-app quiz, and 4 statements matching those used in the *Enduring Love?* study (Gabb et al.), and a further 2 statements about relationship satisfaction. The Quality of Relationship Index (QRI) was generated through second order Confirmatory Factor Analysis (CFA) with Diagonally Weighted Least Squares (DWLS) estimator, as implemented in the lavaan package in R. The final model, which includes 17 congeneric variables, provides adequate fit to the data: $\chi^2(114) = 676.424$, $p < 0.001$, CFI = 0.996, TLI = 0.995, RMSEA = 0.055, 90% CI [0.051, 0.059], SRMR = 0.041. High values of McDonald's hierarchical omega coefficient (ω) and Average Variance Extracted (AVE), ranging from a minimum of $\omega = 0.75$ and AVE = 0.59 for 'Dealing with conflicts', to a maximum of $\omega = 0.89$ and AVE = 0.90 for 'Happy with relationship', indicate that the QRI reaches high levels of reliability and convergent validity. Similar results were found for the second-order factor, with a $\omega = 0.97$ and AVE = 0.67. Standardised parameter estimates and inter-item reliability (R^2) reach medium and mostly high levels, ranging from a minimum of $\beta = 0.57$ ($R^2 = 0.32$) for 'Sex is an important part of our relationship', to a maximum of $\beta = 0.97$ ($R^2 = .94$) for 'How happy or unhappy are you with your relationship, overall?'. To assist readers in interpreting the results, numbers in Figure 3 have been expressed on a scale of 0 to 10 (by multiplying standardised parameter estimates by 10). Out of the 18 items originally used to build the QRI, only the item 'We argue over money' was excluded due to a low factor score and inter-item reliability onto the corresponding factor 'Dealing with conflicts'. Factors scores were saved to be used for subsequent analyses. They were also normalised to range from 0 to 10 to help readers with the interpretability of the results and the graphs.

ⁱⁱⁱ Although equal variances were assumed (Levene test: $F = 0.48$, $df(3, 739)$, $p = 0.69$) due to the extremely unbalanced sample sizes, results of the differences between means are based on ANOVA with Welch approximation: $F = 8.9$, $df(3, 55)$, $p < 0.001$. Based on partial omega-squared, a large effect size was detected for the omnibus test ($\omega^2 = 0.29$, 95% CI: 0.08, 0.45). A post hoc Tukey test showed statistically significant differences only between the group with the lowest score 'One week or less' and the group '1 to 3 months' ($\Delta\bar{x} = 1.50$, $p = 0.011$, 95% CI: 0.24, 2.75), and 'More than 3 months', $\Delta\bar{x} = 1.83$, $p = 0.002$, 95% CI: 0.52, 3.14). No statistically significant difference was found between the group with the highest mean score 'More than 3 months' and the group '1 to 3 months' ($\Delta\bar{x} = 0.85$, $p = 0.29$, 95% CI: -0.82, 0.15).

^{iv} Although equal variances were assumed (Levene test: $F = 1.87$, $df(3, 725)$, $p = 0.13$) due to the extremely unbalanced sample sizes, results of the differences between means are based on ANOVA with Welch approximation: $F = 5.98$, $df(3, 149.68)$, $p = 0.001$. Based on partial omega-squared, a medium effect size was detected for the omnibus test ($\omega^2 = 0.09$, 95% CI: 0.01, 0.17). A post hoc Tukey test showed statistically significant differences only between the group with the highest score 'On 6 or 7 days' and the group who answered 'On 2 or 3 days' ($\Delta\bar{x} = 0.60$, $p = 0.009$, 95% CI: 0.11, 1.10), and the group with the lowest score 'One day or less often' ($\Delta\bar{x} = 0.72$, $p = 0.041$, 95% CI: 0.19, 0.42).

^v Although equal variances were assumed (Levene test: $F = 1.64$, $df(1, 740)$, $p = 0.20$) due to the extremely unbalanced sample sizes, results of the differences between means are based on permutation t-test: ($p < 0.001$, 95% CI: -2.80, -1.33). Based on Cohen's d for Welch t-test, a large effect size was detected for the omnibus test ($d = 0.90$, 95% CI: 0.48, 1.33).

^{vi} Results from multilevel multinomial logistic regression models with cumulative logit link function, reveals a statistically significant fixed effect of 'Time' on the variable corresponding to the statement 'I am very satisfied with how we communicate with each other', $F = 106.41$, $df(3, 1753)$, $p < .001$ and variability in random intercepts ($\sigma^2 = 3.33$, $p < .001$, 95% CI: 2.71, 4.10). Holding Time1 constant (check-up quiz), each level of the predictor variable is statistically significantly associated with a large significant increase in the outcome variable, Time2 (1st check-in quiz), ($b = 1.91$, $p < .001$, 95% CI: 1.63, 2.20, OR = 6.81, 95% CI: 5.14, 9.02), Time3 (2nd check-in quiz), ($b = 2.25$, $p < .001$, 95% CI: 1.96, 2.54, OR = 9.54, 95% CI: 7.14, 12.74), and Time4 (3rd check-in quiz), ($b = 2.17$, $p < .001$, 95% CI: 1.88, 2.45, OR = 8.76, 95% CI: 6.57, 11.67). Predicted values were used to build the corresponding graph.

^{vii} Results from multilevel multinomial logistic regression models with cumulative logit link function, reveals a statistically significant fixed effect of 'Time' on the variable corresponding to the statement 'We are able to discuss and resolve conflict', $F = 43.10$, $df(3, 1752)$, $p < .001$ and variability in random intercepts, ($\sigma^2 = 4.31$, $p < .001$, 95% CI: 3.54, 5.25). Holding Time1 (initial relationship check-up quiz) constant, each level of the predictor variable is statistically significantly associated with a large significant increase in the outcome variable, Time2 (1st check-in quiz), ($b = .80$, $p < .001$, 95% CI: .53, 1.07, OR = 2.23, 95% CI: 1.71, 2.92), Time3 (2nd check-in quiz), ($b = 1.30$, $p < .001$, 95% CI: 1.02, 1.57, OR = 3.68, 95% CI: 2.79, 4.85), and Time4 (3rd check-in quiz), ($b = 1.45$, $p < .001$, 95% CI: 1.17, 1.73, OR = 4.28, 95% CI: 3.24, 5.67). Predicted values were used to build the corresponding graph.

^{viii} Results from multilevel multinomial logistic regression models with cumulative logit link function, reveals a statistically significant fixed effect of 'Time' on the variable corresponding to the statement 'I feel connected with my partner emotionally', $F = 17.41$, $df(3, 1752)$, $p < 0.001$ and variability in random intercepts, ($\sigma^2 = 3.44$, $p < 0.001$, 95% CI: 2.79, 4.23). Holding Time1 (check-up quiz) constant, each level of the predictor variable is statistically significantly associated with a medium significant increase in the outcome variable, Time2 (1st check-in quiz), ($b = 0.75$, $p < 0.001$, 95% CI: 0.45, 1.06, OR = 2.13, 95% CI: 1.57, 2.89), Time3 (2nd check-in quiz), ($b = 0.98$, $p < 0.001$, 95% CI: 0.67, 1.29, OR = 2.67, 95% CI: 1.95, 3.66), and Time4 (3rd check-in quiz), ($b = 0.93$, $p < 0.001$, 95% CI: 0.62, 1.24, OR = 2.55, 95% CI: 1.86, 3.48). Predicted values were used to build the corresponding graph.

^{ix} Results from multilevel multinomial logistic regression models with cumulative logit link function, reveal a statistically significant fixed effect of 'Time' on the variable corresponding to the statement 'We are comfortable discussing our sexual life', $F = 5.69$, $df(3, 1752)$, $p = 0.001$ and variability in random intercepts, ($\sigma^2 = 6.41$, $p < 0.001$, 95% CI: 5.30, 7.75). Holding Time1 (check-up quiz) constant, each level of the predictor variable is statistically significantly associated with a small significant increase in the outcome variable, Time2 (1st check-in quiz), ($b = 0.39$, $p = 0.007$, 95% CI: 0.10, 0.68, OR = 1.48, 95% CI: 1.11, 1.97), Time3 (2nd check-in quiz), ($b = 0.48$, $p = 0.001$, 95% CI: 0.19, 0.77, OR = 1.62, 95% CI: 1.21, 2.16), and Time4 (3rd check-in quiz), ($b = 0.55$, $p < 0.001$, 95% CI: 0.26, 0.84, OR = 1.74, 95% CI: 1.30, 2.33). Predicted values were used to build the corresponding graph.

^x**Development of the Benefits of Paired Index (BPI):** The Benefits of Paired Index (BPI) was generated through first order Confirmatory Factor Analysis (CFA) with Diagonally Weighted Least Squares (DWLS) estimator, as implemented in the lavaan package in R. The final model, which includes 5 congeneric variables and two correlated error terms between the items ‘Paired is improving how we communicate as a couple’ and ‘Paired has helped us to resolve issues in our relationship’, provides adequate fit to the data: $\chi^2(4) = 26.58, p < 0.001$, CFI = 0.998, TLI = 0.996, RMSEA = 0.053, 90% CI [0.035, 0.073], SRMR = 0.022. High values of McDonald’s hierarchical omega coefficient ($\omega = 0.80$) and Average Variance Extracted (AVE = 0.55) indicate that the BPI reaches high levels of reliability and convergent validity. Standardised parameter estimates and inter-item reliability (R^2) reach medium and mostly high levels, ranging from a minimum of $\beta = 0.68$ ($R^2 = 0.46$) for ‘On days when I use Paired, I remember to do something for my relationship’, to a maximum of $\beta = 0.83$ ($R^2 = 0.70$) for ‘Paired has helped me to identify strengths in our relationship’. To help the readers with the interpretation of the results, numbers in Figure 11 have been expressed on a scale of 0 to 10 (by multiplying standardised parameter estimates by 10). Out of the 9 items originally used to build the BPI, four were excluded. The items ‘Our relationship feels stronger since we’ve been using Paired’ and ‘The longer I use Paired, the better my relationship gets’ were excluded due to an overlap with the concept of quality of relationship. The items ‘On days when I don’t use Paired, I forget to do something for my relationship’ and ‘Without Paired, I think we may have split up’ were excluded due to low factor scores and low inter-item reliability. Factors scores were saved to be used for subsequent analyses. They were also normalised to range from 0 to 10 to help readers with the interpretability of the results and the graphs.

^{xi} Given the highly unbalanced sample sizes between the two groups and equal variances assumed (Levene test: $F = 0.09, df(1, 738), p = 0.75$), results of the differences between means are based on permutation t-test ($p < 0.001$, 95% CI: -2.16, -0.69). Based on Cohen’s d for Welch t-test, a large effect size was detected for the omnibus test ($d = 0.84$, 95% CI: 0.41, 1.26).

^{xii} Given the highly unbalanced sample sizes between the two groups and equal variances assumed (Levene test $F = 0.02, df(1, 737), p = 0.88$) results of the differences between means are based on permutation t-test ($p < 0.001$, 95% CI: -0.89, -0.26). Based on Cohen’s d for Welch t-test, a medium effect size was detected for the omnibus test ($d = 0.34$, 95% CI: 0.15, 0.52).

^{xiii} Although equal variances were assumed (Levene test: $F = 0.17, df(3, 737), p = 0.91$) due to the extremely unbalanced sample sizes, results of the differences between means are based on ANOVA with Welch approximation ($F = 9.39, df(3, 51), p < 0.001$). Based on partial omega-squared, a large effect size was detected for the omnibus test ($\omega^2 = 0.31$, 95% CI: 0.10, 0.48). A post hoc Tukey test showed statistically significant differences only between the group with the lowest score ‘More than 1 week but less than 1 month’ and the group ‘1 to 3 months’ ($\Delta\bar{x} = 0.70, p < 0.001$, 95% CI: 0.33, 1.07), and ‘More than 3 months’, $\Delta\bar{x} = 0.86, p < 0.001$, 95% CI: 0.34, 1.39).

^{xiv} Although equal variances were assumed (Levene test: $F = 0.22, df(3, 724), p = 0.87$) due to the extremely unbalanced sample sizes, results of the differences between means are based on ANOVA with Welch approximation ($F = 15.2, df(3, 149), p < 0.001$). Based on partial omega-squared, a large effect size was detected for the omnibus test ($\omega^2 = 0.22$, 95% CI (0.10, 0.32). A post hoc Tukey test showed increasing statistically significant differences between the group with the lowest score ‘One day or less often’ and the group who answered ‘On 2 or 3 days’ ($\Delta\bar{x} = 0.93, p = .013$, 95% CI: 0.14, 1.72), the group who answered ‘On 4 or 5 days’ ($\Delta\bar{x} = 1.06, p = 0.002$, 95% CI: 0.31, 1.81) and the group who answered ‘On 6 or 7 days’ ($\Delta\bar{x} = 1.59, p < 0.001$, 95% CI: 0.89, 2.28). The only non-significant difference was found between the group who answered ‘On 2 or 3 days’ and the group who answered ‘On 4 or 5 days’ ($\Delta\bar{x} = 0.13, p = 0.93$, 95% CI: -0.42, 0.69).

^{xv} Although equal variances were assumed (Levene test: $F = 0.98, df(3, 724), p = 0.39$) due to the extremely unbalanced sample sizes, results of the differences between means are based on ANOVA with Welch approximation ($F = 15.4, df(3, 88.9), p < 0.001$). Based on partial omega-squared, a large effect size was detected for the omnibus test ($\omega^2 = 0.32$, 95% CI: 0.15, 0.45). A post hoc Tukey test showed statistically significant differences between the group ‘Less than 15 minutes’ and all the other groups, namely ‘Between 15

and 30 minutes' ($\Delta\bar{x} = 0.71, p < 0.001, 95\% \text{ CI: } 0.34, 1.07$), 'More than 30 minutes but less than 1 hour' ($\Delta\bar{x} = 0.91, p < 0.001, 95\% \text{ CI: } 0.36, 1.46$), and 'Between 1 and 2 hours' ($\Delta\bar{x} = 1.22, p < 0.001, 95\% \text{ CI: } 0.27, 2.17$). No statistically significant difference was found between the group with the highest mean score 'Between 1 and 2 hours' and the other groups (except 'Less than 15 minutes'), namely 'More than 30 minutes but less than 1 hour' ($\Delta\bar{x} = 0.30, p = 0.87, 95\% \text{ CI: } -0.74, 1.36$) and 'Between 15 and 30 minutes' ($\Delta\bar{x} = 0.51, p = 0.52, 95\% \text{ CI: } -0.45, 1.48$).

^{xvi} A simple OLS regression analysis shows that BPI is statistically associated to QRI, explaining about 29.6% of its variability. The unstandardised regression coefficient shows that, per each unit of increase in BPI, a 0.3 unit of increase is associated to QRI, ($b = 0.30, p < 0.001, 95\% \text{ CI: } 0.23, 0.27$) with small/medium effect size.

^{xvii} Univariate Analysis of Covariance (ANCOVA) with interaction term, was used to assess the moderating effect of levels of happiness on the relationship between the Benefits of Paired Index (BPI) and the Quality of Relationship Index (QRI). Results reveal highly statistically significant associations with the outcome variable (QRI) for BPI ($F = 54.04, df(1, 741) p < 0.001$), with partial eta squared indicating medium effect size, $\eta^2_p = 0.07$, for 'Happiness level' ($F = 9.76, df(4, 741), p < 0.001$) with small effect size, $\eta^2_p = 0.05$, and the interaction between BPI and 'Happiness level' ($F = 4.05, df(4, 741), p = 0.003$), with small effect size $\eta^2_p = 0.02$. Using the group who answered 'Very happy' as reference category, unstandardised parameter estimates show a non-significant effect of BPI on 'Happiness level' amongst those that answered 'Happy' ($b = 0.01, p = 0.881, 95\% \text{ CI: } -0.15, 0.18$), with small effect size $\eta^2_p < 0.001$, and those who answered 'Neither happy nor unhappy' ($b = 0.08, p = 0.391, 95\% \text{ CI: } -0.11, 0.28$), with small effect size $\eta^2_p = 0.001$. The effect becomes statistically significant and of increasing value, first amongst those who answered 'Unhappy' ($b = 0.30, p = 0.02, 95\% \text{ CI: } 0.04, 0.57$), with small effect size $\eta^2_p = 0.007$, and 'Very unhappy' ($b = 0.82, p = 0.001, 95\% \text{ CI: } 0.32, 1.31$), with small effect size $\eta^2_p = 0.01$. The effect of all the independent variables (BPI, Happiness level, and interaction term) explained around 21.5% of the variance of the dependent variable (QRI).