

Individual Wellbeing and Bridge: An Empirical Analysis¹

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The data underpinning this report can be accessed via the University of Stirling's data repository: <https://datastorre.stir.ac.uk/>.

Introduction

There is a growing interest in the Sociology of bridge. This research is part of a wider examination of bridge from a sociological and medical perspective, and is conducted with the intention of providing some of the groundwork for a larger study of the social and cognitive benefits of playing bridge, in particular its role in delaying the onset and reducing the severity of dementia (Ashworth et al., 2016; Graham & Punch, 2016). At the top level, bridge can be a professional card game played full-time by experts who are sponsored to play in teams. It is a mind sport that, even at amateur level, requires much work in terms of developing bridge partnerships and strategies. The dynamics of bridge can be understood in relation to a range of sociological areas such as gender, class, age and generation, identity. In this paper we address another key sociological topic: individual wellbeing. This exploratory study contributes to the evidence base on the benefits of playing bridge by answering the following research questions:

1. What are the characteristics of bridge players and their playing habits?
2. Is there an association between playing bridge and measures of individual wellbeing?

The paper proceeds as follows. First we describe the game of bridge. This is followed by a brief review of the literature on bridge and dementia. We outline the data and methods, before presenting our empirical results. The paper concludes with a discussion of the practical implications of the study and its limitations.

The Game of Bridge

Bridge is one of the world's most widely played stimulating and challenging card games that requires skill, concentration and practice (Pottage, 2006). The game is typically played by four players, both in a casual environment and at competitive tournaments. Amateur players are those who play the game for enjoyment without attempting to obtain financial gain. Professional bridge players are players who, broadly speaking, are paid to teach bridge in clubs, schools or privately; to write books, features or articles; are paid to play by sponsors as part of a team to compete or to play a session or tournament with their client (The Henley Bridge School, 2015). It is always a partnership game, as well as often a team game. It is an intellectual and competitive card game, or in Guttman's term, an "intellectual contest" (Guttman, 1978: 9). Given the requirement for partners, and sometimes for team-mates, bridge involves building and maintaining relationships between players, both at and away from the table. Many people play in local bridge clubs or bridge events on a regular basis, thus the sense of a bridge community often develops as informal networks form. As Osberg (2005) succinctly states, bridge is,

...an elegant game, full of strategy and tactics....but a huge component of Bridge is also very human. This melding of the former with the latter is what sets Bridge apart.

Literature

There is an increasing interest in the links between healthy aging, dementia and participating in socially and cognitively stimulating activities such as bridge. In their comprehensive literature review, Ashworth et al. (2016) note the potential for bridge to be a meaningful activity for older people, particularly those with dementia, and its role in producing positive outcomes for this cohort (see Diamond et al., 2001). However, there are a number of issues associated with playing bridge for individuals with dementia or similar conditions. Anecdotal

evidence reveals players' concerns with declines in the cognitive function of their partners, particularly loss of memory (Carey, 2009; Hutchinson & Nimrod, 2012), while there are a number of intrapersonal, interpersonal and structural barriers to participating in leisure activities in general (Godfrey et al., 2010). Ashworth et al. (2016: pp. 19) summarise the current state of knowledge regarding the benefits of bridge as follows:

Although the evidence to support leisure and wellbeing is not concrete, largely due to the large numbers of variables and reliance on correlational evidence, the pattern of results advocates for further research in this area. In particular, research into the benefits of activities such as Bridge which includes a social aspect and sense of being a 'team player' alongside being mentally challenging would be beneficial in the face of an ageing population and motivation to maintain brain health.

Methodology

To investigate the association between playing bridge and various indicators of wellbeing, an online questionnaire was developed to capture demographic, social, subjective wellbeing, and bridge playing characteristics of individuals. The survey method was selected as it is a productive way of quantitatively capturing both characteristics and perceptions of respondents (May, 2011). Questions relating to demographic, social and wellbeing domains were chosen from a subset of the questions contained in Wave 6 of the English Longitudinal Study of Aging (ELSA). ELSA is a longitudinal survey of a representative sample of individuals in England aged 50 and older. Wave 6 was conducted in 2012 and captured information relating to the health, social, wellbeing and economic circumstances of 10,601 individuals.¹ The population of interest in this study was bridge players and their non-playing counterparts. The questionnaire was mainly disseminated to bridge players in the UK, with a

small number of international and non-bridge playing individuals captured in the sample.

Table 1 below describes the sample and its representativeness.

Table 1. Sample description and response rate

Email list	No. of potential respondents	No. of respondents	Response rate (%)
English Bridge Union (EBU)	30,000	5,575	19
Scottish Bridge Union (SBU)	4,000	1,080	27
International	n/a	304	n/a
Non-bridge	n/a	183	n/a
Total		7,142	

Note: The number of potential respondents is rounded to the nearest 100 and accurate at the time the questionnaires were first sent (June 2016). International: individuals that received the questionnaire through the BridgeWinners site and other forums and playing platforms; most respondents were from the US. Non-bridge: individuals that received the questionnaire through the EBU advertisers list, rotary clubs, and inner wheel groups. The questionnaire was also promoted in the EBU magazine, which may have brought it to the attention of a further 12,000-15,000 people; we are unsure whether these constitute a different group than the email recipients.

The key variables of interest are described in Table 2.

Table 2. Key variables

Factor	Measure	Operationalisation
Demographic	Age	Age – in years – at last birthday. Age is also measured using a categorical variable derived from ELSA: 1 = 50-54 2 = 55-59 3 = 60-64 4 = 65-69 5 = 70-74 6 = 75+
	Sex	1 = Female 0 = Male
	Education	1 = Individual has a first degree or higher 0 = Individual does not have a first degree or higher
	Living partner	1 = Lives with a partner 0 = Does not live with a partner
	Employment	1 = Retired 0 = Not retired
	Social	Socialise
Social network		1 = Individual is a member of a social networking site 0 = Individual is not a member of a social networking site
Wellbeing	Quality of life	19-item CASP scale is used to measure quality of life. The scale covers areas such as feelings of control, pleasure, enjoyment, meaning, sociability, happiness, opportunity and satisfaction. The respondent is asked to rate their response to each statement (e.g. ‘I look back on my life with a sense of happiness’) with one of the options, ‘often’, ‘sometimes’, ‘not often’ or ‘never’. Answers to each of the statements are summed to produce an overall score. The poorest possible quality of life is reflected by a score of 0 and the highest possible quality of life is reflected by a score of 57.
Bridge	Bridge player	1 = Individual plays bridge 0 = Individual does not play bridge
	Bridge sessions	Continuous measure of the typical number of bridge sessions played per month.
	Benefits of playing Reasons for playing	Multiple-response categorical variable. Free-text response.

Summary statistics such as averages, frequency tables and histograms are produced to describe the demographic, bridge and social characteristics of the sample. The association between playing bridge and levels of subjective wellbeing is explored in two ways:

- Comparing the average wellbeing score of individuals that play bridge with those that do not, controlling for demographic and social factors.
- Comparing the average wellbeing score of individuals that play bridge with the ELSA Wave 6 sample.

We use linear regression to model the former, while nearest-neighbour matching is employed to ensure we compare equivalent individuals in our sample and ELSA with respect to wellbeing. Though the study is exploratory in nature, we propose the following hypothesis regarding the effect of bridge on individual wellbeing:

H1. Individuals that play bridge will have higher wellbeing scores, on average, than individuals that do not play the game.

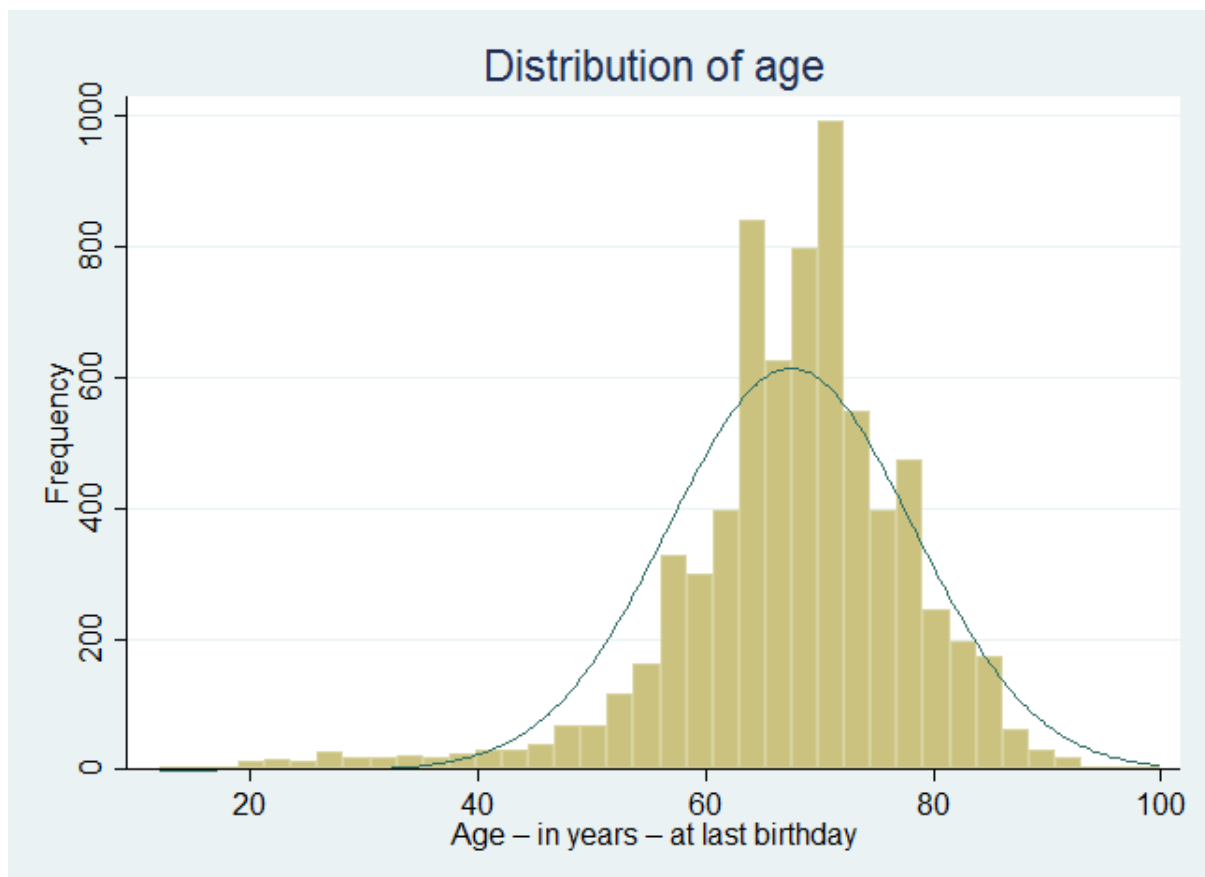
Sample Description

Nearly 80 percent of responses were captured by the link to the survey sent through the EBU, with 15 percent through the SBU link (see Table 1). There are an even proportion of male and female respondents (50.17 and 49.83 to be precise); however, the proportions vary across the different surveys and there is a considerable difference in the number of males and females responding to the International and Non-bridge surveys. Most of the respondents list their current employment situation as 'Retired' – 73 percent, followed by a further 20 percent in employment (full-time, part-time or self-employed). Once again, these figures are dependent on the survey, with lower proportions of International and Non-bridge respondents being retired (38 and 43 percent respectively). Nearly 70 percent of respondents indicate that they

currently live with a spouse or partner. There is a wide range of education qualifications listed by respondents and two-thirds indicate they are educated to at least degree-level; this proportion is similar across the four surveys with the exception of International, where 83 percent have a degree. Over 60 percent of the sample indicates they are not members of a social networking site and the vast majority (88 percent) go out socially or visit friends when they feel like it.

The age of respondents is evenly distributed, with a very small proportion of very young and very old individuals (see Figure 1). The mean and median age is 67 and 69 respectively, while the most common age is 69 years old. There are slight differences in the average age of individuals that responded to different surveys: EBU and SBU respondents are older, on average, by 7-9 years compared to International and Non-bridge respondents.²

Figure 1. Distribution of respondents' age



Results

Bridge: Characteristics of Players and Playing Habits

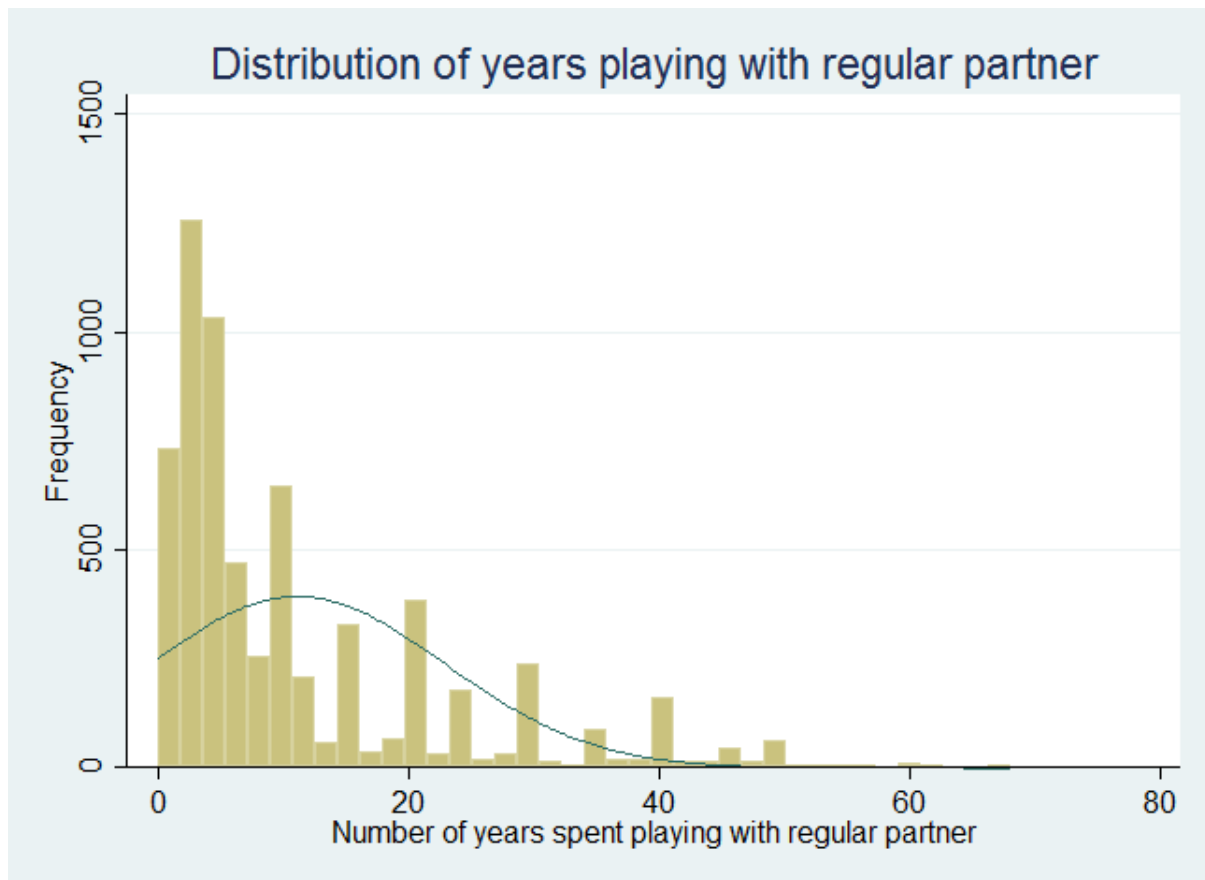
The vast majority of respondents indicate that they play bridge (95 percent), with the exception of individuals completing the Non-bridge survey (20 percent). Interestingly, 171 respondents to the EBU survey indicated that they do not play bridge; the most likely explanation is they are family members of individuals that do play and subscribe to email list – see Table 2.

Table 2. Distribution of playing rates across surveys

Survey	Do not play		Play	
	n	row %	n	row %
EBU	171	3.07	5,402	96.93
International	3	.99	301	99.01
Non-bridge	146	79.78	37	20.22
SBU	4	0.37	1,076	99.63
Total	325	100.00	6,817	100.00

94 percent of individuals that play bridge have regular playing partners, with the mean and median number of partners being 3 and 2 respectively. There is considerable variation in the number of years players have been playing with the regular partner they play most with: some indicate playing for less than year while the maximum value recorded is 68. As Figure 2 reveals, the majority of individuals have been playing with their regular partner for less than 20 years.

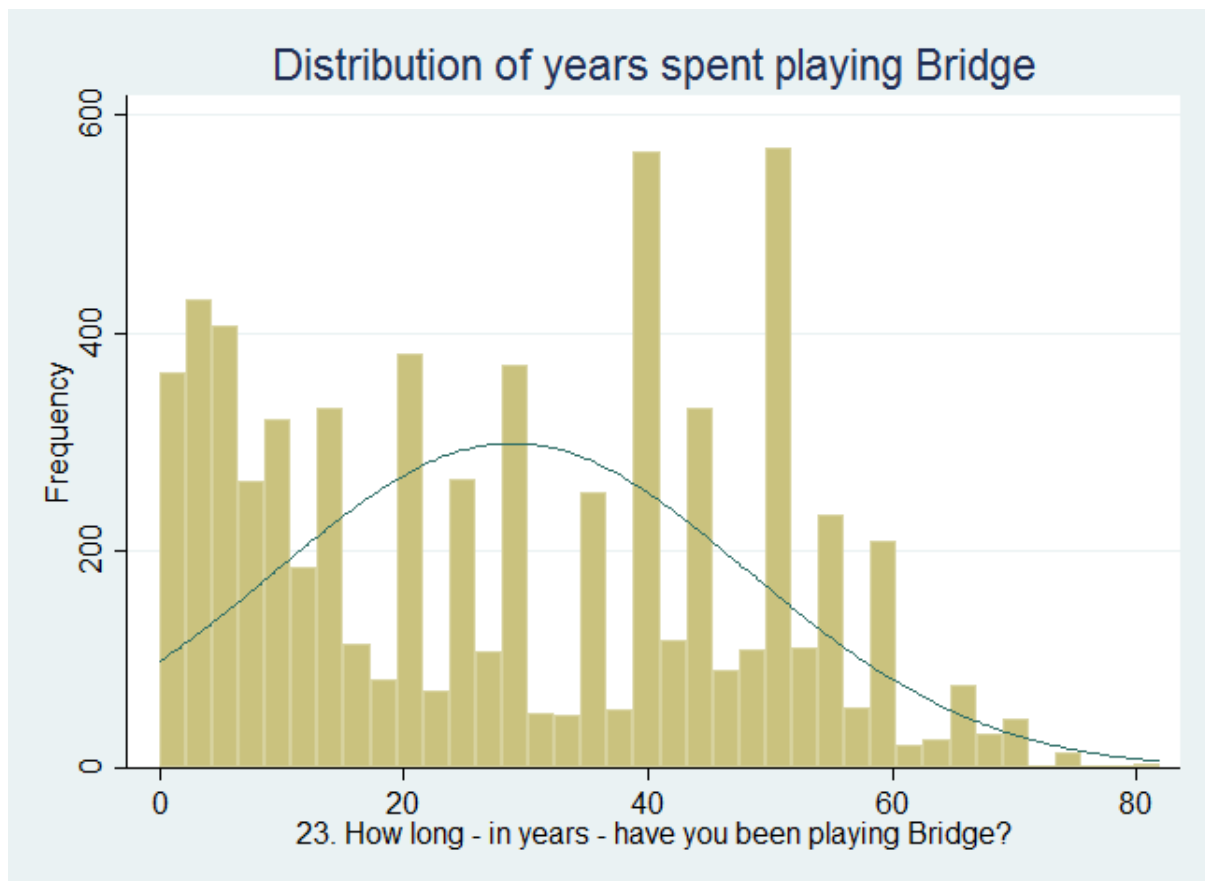
Figure 2. Distribution of years playing with regular partner



Over 97 percent of bridge players indicate that they play up-to 20 sessions per month – the mean and median number of sessions is 10 and 8 respectively.³ However, there are individuals that record the number of sessions they play in a typical month as zero, which may be due to a range of health, family and work factors. It is also important to note the number of sessions varies according to the season, with some respondents highlighting they play more in winter than summer.⁴ Perhaps unsurprisingly given the age distribution of respondents, individuals in the sample have been playing bridge for a considerable period of time: the mean and median number of years is 29 and 30 respectively. Figure 3 displays the distribution of years spent playing bridge and it appears there are two ‘types’ of players: those that are relatively new to the game and those have been playing for a long time.⁵ However, there are concerns about the ability of respondents to accurately record their time

spent playing bridge. First, the presence of ‘spikes’ in the distribution could be interpreted as evidence of respondents rounding their answer to the nearest five or ten. Second, the averages may be an overestimate as many respondents provided answers as to how long they have been playing bridge **including years where they did not play** (i.e. when they first learned until the present day).⁶ Efforts were made to correct this overestimation where possible by subtracting the number of gap years from the overall figure but this was only possible for a small number of responses. As a result, readers should interpret this finding cautiously, as the true average could be higher or lower than that reported here.

Figure 3. Distribution of years spent playing Bridge



Our attention now turns to the ways in which individuals learn to play bridge (Table 3).

Engaging in formal lessons is the most common mode of learning, followed by other methods and family. Some of the examples given by those that responded ‘Other’ include learning at

university and from friends, colleagues and neighbours. The low numbers learning online is at odds with the number of respondents indicating that they play bridge online daily; this is perhaps partly explained by the age of the sample and how long ago many learned to play, though it is an interesting point to bear in mind for advocates of learning bridge online.⁷

Table 3. Modes of learning bridge

How did you learn bridge?	n	%	Cumulative %
Books	592	8.70	8.70
Bridge weekend/cruise	94	1.38	10.09
Family member	1,167	17.16	27.25
In school	649	9.54	36.79
Lessons	3,070	45.14	81.93
Online	55	0.81	82.74
Other	1,174	17.26	100.00
Total	6,801	100.00	

Finally, we focus on the benefits ascribed to playing bridge (Table 4). A majority of respondents indicated that playing bridge brought benefits to them personally in the form of the game having a competitive element, facilitating socialising with friends, and – most commonly – being mentally stimulating and deriving enjoyment from the activity. These findings are consistent across the age range of our sample, with little variation in the percentage of responses or cases for different age groups.

Table 4. Benefits of playing bridge

Benefits	%	
	Responses ⁸	Cases
Other	0.32	1.64
Commitment to partnership	7.42	37.85
Interacting with people from different generations	8.32	42.41
Sense of belonging to a community	8.60	43.87
Welcome distraction/relaxing	9.37	47.78
Socialising with friends	12.38	63.13
Competitive element	16.14	82.26
Mentally stimulating	18.55	94.56
Enjoyable activity	18.89	96.30
Total	100.00 (n=34,749)	100.00 (n=6,816)

Of course, a restricted range of options masks the very personal and particular reasons why individuals play bridge. Respondents elucidated a wide variety of reasons, with many centring on the pleasure derived from participating in the game, the mental challenge, the social element and often all three. As some participants stated:

I enjoy it, I'm good at it, it enlarges my social circle, and it is challenging enough to hold my interest.

It lets me block out all other thoughts and concentrate on the matter at hand. Nothing besides the 52 cards and 4 people at the table exist. [It] makes a nice change sometimes.

It's a challenging game. [There is] so much scope for learning. My dad aged 91 plays and is the brightest, most engaging elderly gent I know and I love to play with him.

Individual Wellbeing

Table 5. Frequency table of responses to quality of life statements

Quality of life statements	n	%			
		Never	Not often	Sometimes	Often
My age prevents me from doing the things I would like to	7,072	27	37	31	6
I feel that what happens to me is out of control	6,972	38	45	16	2
I feel free to plan things for the future	7,017	3	6	21	71
I feel left out of things	6,933	32	44	21	3
I can do the things that I want to do	7,015	2	4	24	71
Family responsibilities prevent me from doing what I want to do	6,973	33	39	24	4
I feel that I can please myself what I can do	7,012	2	6	27	65
My health stops me from doing the things I want to do	7,009	36	32	25	7
Shortage of money stops me from doing the things I want to do	6,986	48	31	16	5
I look forward to each day	6,995	1	4	25	70
I feel that my life has meaning	6,958	2	7	30	61
I enjoy the things that I do	7,048	0	1	17	82
I enjoy being in the company of others	7,049	0	3	27	69
On balance, I look back on my life with a sense of happiness	7,032	1	6	29	64
I feel full of energy these days	6,986	4	21	51	24
I choose to do things that I have never done before	6,942	5	35	47	14
I feel satisfied with the way my life has turned out	7,013	2	8	37	53
I feel that life is full of opportunities	6,974	2	13	41	44
I feel that the future looks good for me	6,962	3	13	43	41

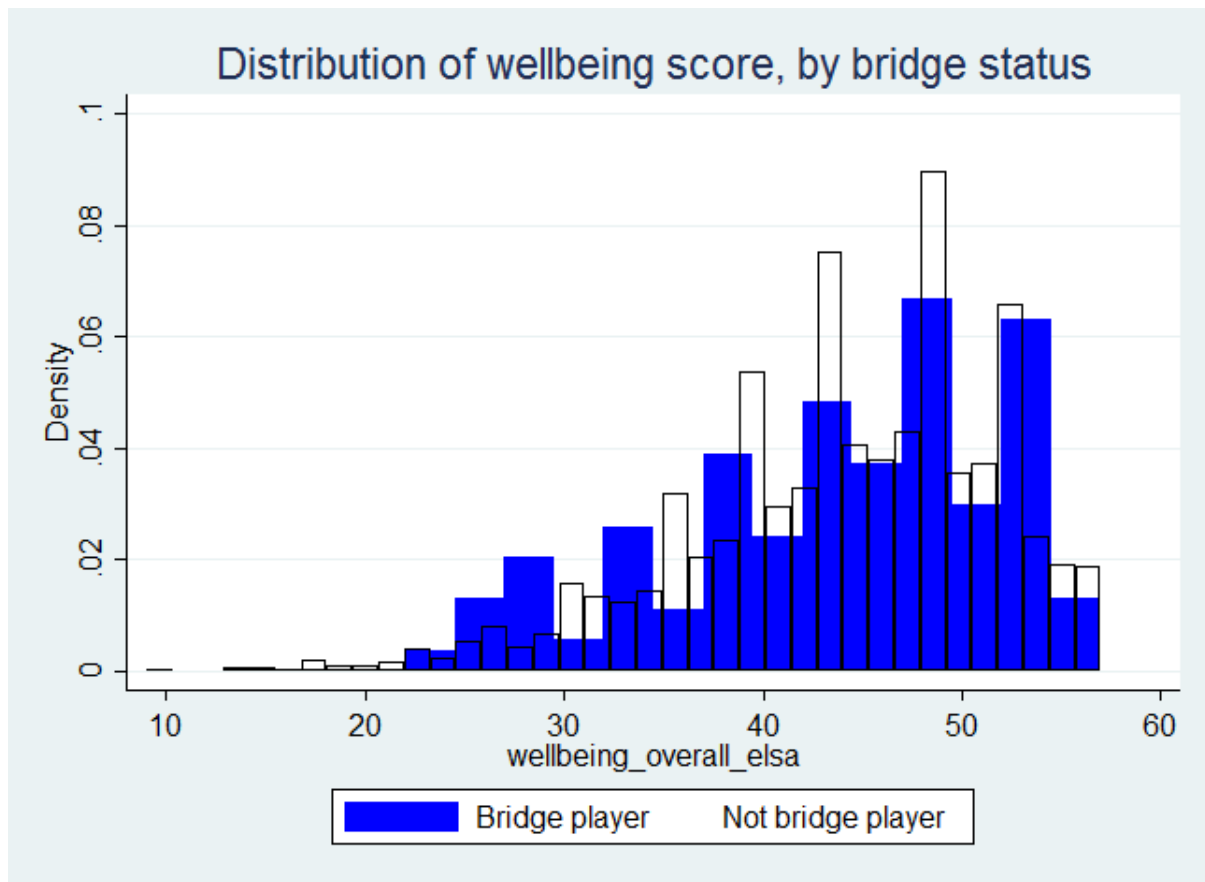
Note: Percentages are rounded to the nearest whole number and thus rows may not sum to 100.

Question text: Here is a list of statements that people have used to describe their lives or how they feel. We would like to know how often, if at all, you think they apply to you.

Our attention now focuses on the self-reported wellbeing of respondents (Table 5). On the whole it appears that individuals are optimistic about their future and the opportunities available to them, satisfied with the way their lives have turned out, sociable, unencumbered by money concerns and feel they are in control of their own lives. On the other hand, a large minority of respondents reported they at least sometimes feel that their age and health prevents them from pursuing activities.

We now explore whether these findings vary across the characteristics of individuals, aspects of their social lives and whether they play bridge or not. Figure 4 displays the distribution of overall wellbeing score by whether a respondent plays bridge or not. We observe that the distributions are alike, indicating that the range of wellbeing scores is similar for bridge and non-bridge players alike (i.e. it does not look like there are any scores that are only possible for bridge players to report). This suggests that there is not much of association between whether you play bridge and quality of life. This is corroborated by the lack of a statistically significant difference in the mean and median scores of these two groups: bridge players have a mean and median wellbeing score of 44 and 45 respectively, while non-bridge players have a mean and median wellbeing score of 43.5 and 45 respectively.

Figure 4. Distribution of overall wellbeing score, by bridge status



In order to examine what factors account for variation in average wellbeing, we develop a statistical model using linear regression. We model an individual’s wellbeing score as a function of age, sex, retirement status, whether they have a higher educational qualification (i.e. degree or higher), the presence of a partner with whom they live, membership of a social network, ability to socialise when they feel like it and whether or not they play bridge (Table 6). The coefficients in the model estimate the magnitude and direction of the effect of each explanatory variable on wellbeing: a one-unit change in the explanatory variable is associated, on average, with an increase or decrease in an individual’s wellbeing score.⁹ For categorical variables, a reference category is chosen so as to compare the effect of being in one category over another: for example, the effect of being female is in comparison to being male.

Table 6. Results of multiple regression model

	Coefficient	SE	95% CI	
			Lower	Upper
Age	-.02*	.01	-.04	-.00
Female	.79***	.20	.40	1.18
Ability to socialise when feel like it	5.85***	.29	5.27	6.42
Member of an online social network	-.16	.20	-.55	.24
Live with a spouse or partner	1.36***	.21	.95	1.77
Retired	1.05***	.26	.54	1.56
Degree or higher	.47*	.21	.06	.88
Bridge player	1.49**	.46	.58	2.39
Constant	36.44***	.86	34.75	38.12
Observations			6,385	
R-squared			8%	

Note: Figures rounded to two decimal places. CI: Confidence Interval. R-squared: proportion of variance explained; a low percentage such as the one reported in table suggests that there are other factors not included here that play a role in explaining variation in wellbeing score. * $p < .05$. ** $p < .01$. *** $p < .001$.

We first examine our main explanatory variable of interest: the effect of playing bridge. The results of the model suggest that individuals that play bridge have slightly higher levels of overall wellbeing; on average playing bridge is worth an additional 1.48 points to an individual's score, net of the other factors in the model and this figure is statistically significant, implying that this finding is unlikely to have resulted by chance. However, it should be borne in mind that this finding is sensitive to model specification decisions. As Table 8 in the appendices reveals, restricting the sample to those aged 50 and older reduces

the effect of bridge on wellbeing. Perhaps unsurprisingly, the ability to socialise when an individual feels like it has a larger effect on wellbeing, accounting for an additional 5.8 points on average compared to those that cannot. Females have higher scores compared to males, as do those living with a spouse or partner.

We now focus on exploring the effect of specific characteristics of playing bridge on overall wellbeing scores, controlling for the variables in the previous model (Table 7). For those that play bridge, it appears that the specifics of playing bridge – number of sessions played per month, number of regular partners, years spent playing bridge and years spent playing bridge with current regular partner – do not account for variation in individual wellbeing scores.

Table 7. Results of multiple regression model, bridge characteristics

	Coefficient	SE	95% CI	
			Lower	Upper
Number of bridge sessions	-.01	.02	-.05	.03
Number of regular partners	-.02	.01	-.03	.00
Number of years spent playing with regular partner	.01	.01	-.01	.03
Number of years playing bridge	-.00	.01	-.01	.01
Controls	Yes			
Constant	36.50	.68	35.17	37.83
Observations	5,313			
R-squared	8%			

Note: Figures rounded to two decimal places. Controls: Age, Female, Ability to socialise when feel like it, Member of an online social network, Live with a spouse or partner, Retired and Degree or higher. CI: Confidence Interval. R-squared: proportion of variance explained; a low percentage such as the one reported in table suggests that there are other factors not included here that play a role in explaining variation in wellbeing score. *p < .05. **p < .01. ***p < .001.

We conclude our analysis with a comparison of the distribution of wellbeing score for our sample and Wave 6 of ELSA. In order to do so we restrict our sample to those aged 50 and older and that do not have missing data for wellbeing score; we then apply nearest-neighbour matching to compare the average wellbeing scores of equivalent individuals with respect to age, sex and living arrangements.¹⁰ Individuals in our sample have much a larger, statistically significant average wellbeing score than respondents to ELSA Wave 6 – 25.92. What is not clear is what factors account for this difference, outwith playing bridge and those controlled for through nearest-neighbour matching.

Conclusion

Bridge players report high levels of subjective wellbeing, revealing they are optimistic about their future and the opportunities available to them, satisfied with the way their lives have turned out, sociable, unencumbered by money concerns and in control of their own lives.

However, the results of this study do not conclusively show that they enjoy greater levels of wellbeing than their non-bridge playing counterparts. There is a small, statistically significant positive effect of playing bridge in our sample, and a large difference in average wellbeing between our sample and ELSA Wave 6 respondents. These findings are consistent with the wider literature on the link between leisure activities and positive cognitive, social and quality of life outcomes (see Ashworth et al., 2016 for a comprehensive overview).

There are a number of methodological limitations and implications of this research that require elaboration. The sample is heavily weighted towards bridge players, with even those indicating they do not play the game being made aware of the survey through bridge community communications channels; it is plausible that many of these respondents are family members of bridge players. This study also examined only one, albeit standard, domain of wellbeing – CASP-19 quality of life. Other credible measures of wellbeing could have been selected, including physical wellbeing or cognitive ability. What is clear is the need for unambiguous research designs to test the effect of playing bridge on a chosen measure of wellbeing. Experimental or quasi-experimental approaches could isolate the specific effect of playing bridge, eliminating confounding factors that are almost certainly a feature of this study.

Acknowledgements

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Appendices

Table 8. Results of multiple regression model, excluding individuals < 50 years old

	Coefficient	SE	95% CI	
			Lower	Upper
Age (reference = 50-54)	-	-	-	-
55-59 years old	1.21*	.58	.08	2.34
60-64 years old	2.38***	.54	1.31	3.44
65-69 years old	2.13***	.55	1.05	3.21
70-74 years old	1.38*	.56	.28	2.48
75+ years old	-.08	.57	-1.20	1.04
Female	.65**	.20	.25	1.04
Ability to socialise when feel like it	5.68***	.30	5.09	6.27
Member of an online social network	-.15	.20	-.55	.25
Live with a spouse or partner	.92***	.22	.49	1.34
Retired	.46	.27	-.08	1.00
Degree or higher	.32	.21	-.09	.73
Bridge player	.47	.52	-.55	1.49
Constant	35.69	.76	34.21	37.18
Observations			6,056	
R-squared			8%	

Note: Figures rounded to two decimal places. CI: Confidence Interval. R-squared: proportion of variance explained; a low percentage such as the one reported in table suggests that there are other factors not included here that play a role in explaining variation in wellbeing score. * $p < .05$. ** $p < .01$. *** $p < .001$. Individuals younger than 50 years old are excluded from the model and subsequent analyses in order to facilitate better comparison with the ELSA sample and to focus on older individuals (n=354).

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¹ Further information on the study, including question modules and sample design, can be found at: <http://www.elsa-project.ac.uk/about-ELSA>.

² This may be due to the channel through which respondents were alerted to the survey. The International and Non-bridge surveys were advertised on social media platforms (e.g. Facebook and BridgeWinners), while the EBU and SBU surveys were distributed through email lists.

³ A session is typically 24 boards (hands), with each hand lasting seven and half minutes. Thus, a session usually lasts three and a half hours including breaks (in the UK).

⁴ There are a wide variety of sessions that individuals can participate in, including bridge congresses, club meets, afternoon and evening games and online sessions.

⁵ Note how the data clusters at the lower (< 20) and upper (40+) ends of the distribution.

⁶ A minority of respondents provided details on the reasons they took a break from playing bridge, with the most common response being for family reasons, followed by work.

⁷ It is widely acknowledged that it is much easier to learn bridge through face-to-face or interactive methods and hence there may be a natural limit on individuals learning the game through other methods. There is also – as far as we are aware in the UK – a lack of online materials and platforms through which individuals can learn to play bridge. However, people

can and do play bridge online through Bridge Base Online (<https://www.bridgebase.com/>) and can discuss the game on the BridgeWinners blog (<http://bridgewinners.com/>).

⁸ Responses is the percentage of the total number of categories chosen by individuals – respondents could select more than one benefit, hence why the number of responses is larger than the size of the sample. Cases refers to the percentage of respondents that selected a particular benefit.

⁹ To calculate an individual's predicted wellbeing score, you sum the estimated effect of each of the explanatory variables, including the constant. For example, a 55 year old, female bridge player that socialises when she feels like it would have a predicted score of $35.69 + 1.21 + .65 + 5.68 = 43.23$.

¹⁰ The effect of being in our sample is estimated using the *teffects* command in Stata, using nearest-neighbour matching on age, sex and living arrangements (including exact matching on sex).