Computers in Human Behavior Reports 17 (2025) 100557

Contents lists available at ScienceDirect

Computers in Human Behavior Reports

journal homepage: www.sciencedirect.com/journal/computers-in-human-behavior-reports

Understanding age-related differences in online prosocial behavior: A qualitative thematic analysis of interpersonal, ideological, and mixed patterns

Algae Kit Yee Au [a], Sophie Kai Lam Cheng [a,b], Wesley Chi Hang Wu [a], David H.K. Shum [c], John B. Nezlek [d,e], Bryant Pui Hung Hui [a,f,*]

[a] Department of Applied Social Sciences, Hong Kong Polytechnic University, Hong Kong SAR, China
[b] Department of Psychology, Chinese University of Hong Kong, Hong Kong SAR, China
[c] Department of Rehabilitation Sciences, Hong Kong Polytechnic University, Hong Kong SAR, China
[d] Center for Climate Action and Social Transformations, Institute of Psychology, SWPS University, Warsaw, Poland
[e] Department of Psychological Sciences, College of William & Mary, Williamsburg, VA, USA
[f] Mental Health Research Center, Hong Kong Polytechnic University, Hong Kong SAR, China

ARTICLE INFO

Keywords:
Online prosocial behavior
Ideological OPB
Interpersonal OPB
Mixed OPB
Age differences

ABSTRACT

Prosocial behaviors (PB), referring to voluntary acts intended to benefit others, have become increasingly prevalent online due to advancements in Internet and technology, providing opportunities to benefit people globally. Moreover, previous research suggests that age is a crucial determinant of PB, although the findings are mixed. This study explored the types of online prosocial behaviors (OPB) preferred by different age groups among a sample of 31 Hong Kong Chinese aged 20–70. The participants included a roughly equal number of females and males, recruited through social media platforms. Participants engaged in four focus group discussions, sharing their experiences and thoughts on OPB. The thematic analysis was guided by a recently developed classification of prosociality, distinguishing between interpersonal prosociality (direct PB with immediate feedback) and ideological prosociality (indirect benefits toward collectives without immediate outcomes). Inductive codes that could not be allocated to either type were grouped as a new theme. Three themes emerged: (i) interpersonal OPB (e.g., helping others online for specific goals), (ii) ideological OPB (e.g., concern about injustice and environmental issues), and (iii) mixed OPB (e.g., saving animals, updating COVID-19 information). We found that attention to interpersonal prosociality was highest among older adults (aged 60+), while younger adults (aged 18–29) exhibited greater concern for ideological OPB compared to their older counterparts. Our findings contribute to the conceptual framework of prosociality and underscore the importance of age-related factors in future quantitative research on OPB and on the design of online charity campaigns.

1. Introduction

1.1. Age and prosocial behavior

Prosociality (or prosocial behavior) is a constellation of voluntary and intentional acts that aim to benefit others (Eisenberg, 1982; Hui et al., 2020), including but not limited to the acts of helping, sharing, comforting, guiding, rescuing, and defending (Batson & Powell, 2003; Dovidio et al., 2017). The positive effects of prosociality on both societal functioning (McCullough et al., 2008) and individual well-being (Dunn et al., 2008) have been well-documented. Some demographic characteristics have been found to be associated with prosociality. For instance, women are more likely to offer emotional support in close relationships, while men tend to show more agentic prosocial behavior toward strangers and social collectives (Eagly, 2009). Notably, high-income individuals are more likely to donate money and time to a good cause than those with lower income (Macchia & Whillans, 2021). Furthermore, people living in rural areas are more likely to participate in volunteer work when compared to urban residents (Paarlberg et al., 2022; Svendsen & Svendsen, 2016).

Prosociality can be shaped by cultural factors (Luengo Kanacri et al., 2021). In China, prosocial behavior is deeply rooted in collective

* Corresponding author.
E-mail address: phhui@polyu.edu.hk (B.P.H. Hui).

https://doi.org/10.1016/j.chbr.2024.100557
Received 20 July 2024; Received in revised form 2 December 2024; Accepted 5 December 2024
Available online 6 December 2024

cultural norms and Confucian values, which emphasize cooperation and prioritize hierarchy over egalitarianism (Feygina & Henry, 2015; Guo et al., 2021). These values promote positive ingroup ties through helping behaviors, particularly in maintaining interpersonal harmony with influential figures. However, acceptance of these traditional values has declined among younger generations, indicating a shift in attitudes toward prosocial actions (Fu et al., 2021; Yang et al., 2018). Despite a decline in traditional practices, the emphasis on ingroup helping in Chinese culture remains strong (Luengo Kanacri et al., 2021; Schwartz, 2006).

Nevertheless, we cannot expect the same patterns of prosociality to be directly mirrored in every Chinese society, such as Hong Kong. As a special administrative region of China, Hong Kong is a highly globalized city with a unique history as a predominantly ethnic Chinese society that was once a British colony. It serves as a cultural nexus where Chinese and Western influences converge (Louie, 2010). This legacy has shaped various aspects of Hong Kong culture, including its legal system, education, and social values, resulting in a distinctive blend that differs from those in Mainland China. The "One Country, Two Systems" principle (Constitutional and Mainland Affairs Bureau, 2024) further emphasizes the differences in governance and societal norms, allowing Hong Kong to maintain a unique cultural identity that reflects its contemporary globalized status, illustrating how its values and behaviors stand apart from those in mainland China.

Research has found that prosocial behavior differs as a function of people's age (Cutler et al., 2021; Lockwood et al., 2021; Sze et al., 2012). From a socioeconomic perspective, middle-aged and older adults are particularly well-positioned to perform prosocial acts because they have more resources such as time, energy, and wealth to contribute than their younger counterparts (Freund & Blanchard-Fields, 2014; Mayr & Freund, 2020). Consistent with this, compared to younger adults, older adults have been found to be more prosocial in donating money or sharing materials (Li et al., 2024; Sze et al., 2012). Older adults also tend to make greater efforts in physically demanding prosocial tasks than younger people (Lockwood et al., 2021; Raposo et al., 2021).

Several prevailing theories exist to explain the phenomenon of the increase in prosociality with age. According to Erikson's theory of psychosocial development (Erikson, 1985; Erikson et al., 1989), generativity—the tendency to focus on giving back to society and leaving a legacy for others—emerges in middle adulthood and continues until late adulthood (Erikson et al., 1989; Villar et al., 2023). An increase in prosociality is also part of the prosocial growth hypothesis proposed by van Lange and colleagues (van Lange et al., 1997). They suggest that over the course of adulthood, people's motivations for resource management shift from competition for scarce resources during younger adulthood to responsibility for others during middle adulthood, then to achieving mutual interdependence in older age. Also, Carstensen in her Socioemotional Selectivity Theory (SST; Carstensen, 2006) proposes that with age a sense of finite time motivates an evolving set of goals toward meeting emotional needs, resulting in increased empathy and enhanced prosocial behavior with age (Beadle et al., 2015; Carstensen, 2006).

Nevertheless, some recent research indicates a potential decline in prosociality with age. Studies involving economic games show that older participants, compared to younger ones, tend to maximize their gains, allocating more fund to themselves than to others (Ehlert et al., 2021; Falco et al., 2023), which contrasts with earlier findings of greater prosocial tendencies among the elderly in such games (Bailey et al., 2013; Matsumoto et al., 2016). This emerging contrary evidence highlights an important research gap regarding age-related prosocial behavior and the need for further investigation to better understand the factors influencing these variations across different age groups.

1.2. Two types of prosocial behavior

Though prosociality fundamentally aims to benefit others, it can take different forms, involving different actions, targeting different beneficiaries, and producing different outcomes. As recently proposed by Nezlek (2022), prosociality can be conceptualized into two distinct domains: interpersonal and ideological prosociality. Interpersonal prosociality involves direct actions that elicit immediate emotional feedback and benefit specific individuals (Nezlek, 2022), such as giving food to a needy family or donating money to an individual. Traditionally, prosocial research has focused on this type of interpersonal prosociality (e.g., Penner et al., 2005).

In contrast, ideological prosociality refers to indirect actions that benefit collectives, often over time (Nezlek, 2022), such as signing a petition to raise the minimum wage. While this act does not provide immediate benefits to individuals, it can lead to broader societal change in the long run. This new distinction is supported by emerging research demonstrating that interpersonal prosociality is positively related to well-being, whereas ideological prosociality is negatively related to well-being (Nezlek, 2023). However, to develop a comprehensive understanding of prosocial behavior, more research is needed to validate this framework and to understand how these two forms of prosociality are manifested across different age groups.

Based on Carstensen's Socioemotional Selectivity Theory (SST), we expected that younger adults would be more ideologically prosocial, while older adults would be more interpersonally prosocial. Younger adults, with their perceived expansive time ahead, tend to pursue future-oriented goals (Carstensen, 2006). Ideological prosociality, often linked to social justice and social transformation, holds greater potential for creating significant societal change in the future, making it particularly appealing to younger generations despite its lack of immediate experiential rewards. In contrast, older adults, given their perceived limited time, tend to focus on present-oriented goals and prefer imminent emotional rewards over uncertain future gains. Interpersonal prosociality, characterized by clear, direct, and observable relationships between actions and immediate outcomes, is more emotionally gratifying and thus more attractive to them. As we expect that the shift from ideological to interpersonal prosociality is influenced by changing perceptions of remaining time, we also anticipate that this shift will manifest in Millennials and Generation X as transitional phases characterized by an increasingly prioritization on emotional rewards, alongside a decreasing interest on social issues. Nevertheless, empirical evidence supporting these theoretical expectations is limited, highlighting the need for further research.

Previous study has also provided some initial clues and showed that older adults may have a stronger inclination toward interpersonal prosociality than younger individuals. The study was conducted among 155 Chinese people aged 18–84 years and used a hypothetical donation task to examine age differences in prosocial behaviors (Gong et al., 2019). Specifically, participants were asked to donate an amount of hypothetical money to a relative or nonrelative. Compared to younger adults, older adults tended to give more to relatives and less to nonrelatives, indicating an increased preference in helping socially close others as people age. In terms of interpersonal and ideological prosociality, such preferences in helping familiar people among older adults could also be interpreted as a manifestation of interpersonal prosociality, because the act of kindness targets a more specific group (relatives they are close to) rather than the larger collectives (people they may not know or are not close to). Yet, the study's sole reliance on a hypothetical scenario highlights the need for research that allows participants to reflect on their real-life experiences, as this can provide more accurate and nuanced insights into prosocial behavior by capturing genuine emotions, motivations, and contextual factors that hypothetical scenarios may overlook.

1.3. Online prosocial behavior

Advances in technology have provided an additional context within which prosociality can occur, and these developments may be

particularly relevant for interpersonal prosociality. People from all walks of life and all corners of the world can now offer or receive acts of kindness online (Armstrong-Carter & Telzer, 2021). Moreover, people can remain anonymous more easily in cyberspace than in many physical world settings.

Anonymity may make it easier for people to request help (e.g., people may find asking for assistance embarrassing), and it may make it easier for people to provide help (e.g., remaining anonymous reduces the likelihood of receiving unsolicited requests for help). Such anonymity may not be as relevant to ideological prosocial behavior, which may not necessarily entail benefits to a specific person, but to the extent that not disclosing one's personal identity is viewed as desirable, cyberspace may be more conducive to being ideologically prosocial compared to the physical world.

It can also be more efficient to act prosocially in cyberspace than in the physical world (Wallace, 2015; Zheng et al., 2018). For example, donations can be made with a few clicks versus arranging payments with checks or via other physical means. Online platforms enable people to broadcast their needs to a wider audience. Connections between those benefit providers and benefit receivers can be made more efficiently. These benefits are pertinent to both interpersonal and ideological behaviors. Overall, such reduction of social and temporal barriers presented by the digital environment may have a more significant impact on prosocial behaviors than traditional, offline avenues (Armstrong-Carter & Telzer, 2021; Zeng et al., 2023; Zheng et al., 2018).

Importantly, a digital divide between the younger and older adults (Neves & Mead, 2021; Pew Research Center, 2022) may influence both the frequency and characteristics of online prosocial behavior for people of different ages. According to a recent survey conducted in the United States by the Pew Research Center (2022), older adults (aged 65 years and above) have the lowest adoption rates of digital technologies, whereas younger adults (aged 18–29) have the highest rates among all adult age groups. In particular, only 61% of older American adults own a smartphone and 45% of them use social media, lagging far behind younger adults whose smartphone ownership and social media usage stand at 96% and 84%, respectively (Pew Research Center, 2022).

A similar age-specific digital divide exists in Hong Kong. As one of leading technological hubs in the globe with a remarkable Internet penetration rate of 95.6% (Statista, 2022, 2024a), Hong Kong has approximately 99.9% of adults aged 25 to 34 owning a smartphone, while only 90.7% of older adults aged 65 or above do (Statista, 2023). Moreover, older adults, who represent 22.8% of Hong Kong's total population (Census and Statistics Department, 2024), account for only 8% of Facebook users and 3.7% of Instagram users among all adults. In contrast, nearly 30% of Facebook users and over one-third of Instagram users are aged 25 to 34 (Statista, 2024b, 2024c). As a result of their lower adoption rates of digital technologies and limited social media engagement, older adults may be less active in any online activity, let alone online prosocial behavior.

In addition to disparities in Internet access, discrepancies in digital literacy may further exacerbate the age-related divide in the engagement of online prosocial behavior. Younger adults, often referred to as digital natives, have either been born into the digital age or have had early exposure to the Internet. This early access to a wealth of online information, including news about global injustice, enhances their understanding of the world and fosters a sense of belonging. Previous research indicates that the Internet connects individuals to the global community, encouraging active participation in global events, particularly among young people (Kwak et al., 2006).

Age plays a crucial role in shaping attitudes and behaviors toward globalization. A study found that Millennials are more open to global culture than Generation X and Baby Boomers (Carpenter et al., 2012), Although Generation Z was not included in the study, their deeper immersion in digital technologies suggests their receptiveness may exceed that of previous generations, which may further facilitate the development of their global identity. This development provides them with "a sense of belonging to a worldwide culture and … an awareness of the events, practices, styles, and information that are part of the global culture" (Arnett, 2002, p. 777). Research shows that identification as world citizens is closely associated with six clusters of prosocial values: intergroup empathy, intergroup helping, valuing diversity, social justice, environmental sustainability, and a sense of responsibility to act for the betterment of the world (Reysen & Katzarska-Miller, 2018); whereas global identity is positively correlated with priorities to reduce global poverty (Bayram, 2019) and concerns for human rights (Hackett et al., 2015). Young people's digital literacy may help manifest their global identity by enabling them to engage in ideological prosocial behaviors on the cyberworld, such as crowdsourcing (Baruch et al., 2016), contributing to Wikipedia entries (Jadin et al., 2013), and digital activism (George & Leidner, 2019).

In contrast, middle-aged adults usually start picking up advanced technologies later in their professional and personal lives and may be more inclined to engage in less technology-demanding prosocial acts such as sharing timely and useful information online (Lee et al., 2015), or participating in online volunteering (Amichai-Hamburger, 2008), which fall into the interpersonal domain (Nezlek, 2022). Lastly, probably due to their general limited access to and lack of knowledge of digital technologies, older adults may be less likely than the younger age groups to take part in any kind of online prosocial behavior. Even if they do, their online acts of kindness are likely to be interpersonal in nature, in line with their tendency to pursue present-rather than future-oriented goals (Carstensen, 2006) and prioritize helping specific others over the larger collectives (Gong et al., 2019).

Although there has not been much research examining the patterns of online prosocial behavior among people of different age groups, a study on media posts regarding organ donation found that individuals under 30 years old were more likely to share such information through social media than older people (Jiang et al., 2019). However, the study focused solely on organ donation and did not provide sufficient insights into the age difference in other types of online prosocial behavior. This gap highlights the need for further research on a broader range of online prosocial activities across age groups to understand how different demographics, for example, older adults from the Baby Boomer generation, middle-aged adults from Generation X, young-middle-aged adults from the Millennial generation, and younger adults from Generation Z engage with digital platforms for social good, given their varying levels of digital literacy and global exposure.

The increasing significance of the digital world as a platform for prosociality, combined with the present-vs. future-oriented goals of different age groups, the age-related sense of global identity, and the generational digital divide, highlight the potential age-related differences in online prosocial behavior. This perspective underscores the likelihood that younger individuals engage more actively in online prosocial activities, particularly regarding global issues and social justice, compared to their older counterparts. Our study aimed to address this critical gap by exploring these age-related differences in online prosociality through the lens of interpersonal and ideological framework. Conducted among Hong Kong Chinese, our research is particularly relevant given that Hong Kong is one of the most technologically advanced societies in the world with a unique blend of Chinese and Western cultures and a high degree of globalization. It is interesting to investigate how this interpersonal and ideological prosociality framework, which originated in Western culture, is applicable in this specific context. Using a qualitative approach, we examined these age-related distinctions in online prosocial behavior and examined the potential to enrich this framework with additional complementary dimensions. This comprehensive analysis aimed to deepen our understanding of how age influences digital engagement and to offer valuable insights for fostering effective prosocial initiatives across generations.

1.4. The present study

Based upon our literature review, our research sought to address the following two research questions:

RQ1: Can online prosocial behavior be classified within the interpersonal and ideological framework, or are there additional dimensions of prosociality that need to be considered?
RQ2: Do age-related differences in online prosocial behaviors manifest across the interpersonal, ideological, and potentially other dimensions identified in response to RQ1?

To answer these two research questions, we examined the online prosocial behaviors of four different age groups in Hong Kong through semi-structured focus group discussions. The use of qualitative methods, such as semi-structured focus group discussions, is essential for capturing the nuanced experiences and motivations behind online prosocial behavior (OPB) across different age groups. This approach provides a rich understanding of how different age cohorts perceive and engage in OPB, revealing potential new dimensions of prosociality that may inform more effective cross-generational initiatives. Due to their interactive nature, focus group discussions were organized to facilitate comments and questions among respondents for better comprehension and easier clarification (Grønkjær et al., 2011). Every discussion group consisted of seven to eight participants of the same age range to capture age-specific perspectives and distinct experiences in online prosocial behavior (Halcomb et al., 2007).

2. Method

2.1. Participants

A total of 31 participants, 15 women and 16 men, aged 20 to 70 ($Mage = 40.03$; $SD = 17.52$), were recruited to take part in four semi-structured, in-depth focus group discussions using a validated web-based recruiting model (Pedersen & Kurz, 2016). Advertisements on Facebook and Instagram targeted Hong Kong residents and were further shared through LinkedIn, X, and WhatsApp to enhance visibility. The recruitment strategy sought a diverse audience without focusing on specific communities.

Each participant was of ethnic Chinese descent, fluent in Cantonese, and familiar with digital technology use, with those lacking digital device experience being excluded. Participants were allocated into four focus group sessions according to their age groups: 18–29 years, 30–44 years, 45–59 years, and 60 years or above, largely corresponding to Generation Z, Millennials, Generation X, and baby boomers, respectively. This categorization reflects the present- vs. future-oriented goals of different age groups, their sense of global identity, and the generational digital divide, highlighting potential age-related differences in online prosocial behavior. Each group had eight participants, except for the 18–29 group, which had seven participants because one of them failed to appear as scheduled. This sample size aligns with recommendations in qualitative research literature, deemed sufficient to achieve thematic saturation (Morgan, 1996). Demographic information of the participants is shown in Table 1.

Table 1
Demographics of participants (N = 31).

Variable	*N* (%)
Sex	
Female	15 (48.4)
Male	16 (51.6)
Education	
Primary or below	0 (0)
Secondary	5 (16.13)
Post-secondary	3 (9.68)
Bachelor's degree or above	23 (74.19)
Employment	
Employed	13 (41.94)
Unemployed	1 (3.23)
Retired	9 (29.03)
Students	6 (19.35)
Others	2 (6.45)

2.2. Procedure

The focus group sessions were conducted in September 2021 at the corresponding author's affiliated institution, with ethical approval obtained from the institution's research ethics committee. Before each session, informed consent was obtained from all participants to indicate their voluntary participation in the research study and their understanding of their rights to both participate and withdraw. To ensure free communication among respondents, all focus group discussions were conducted in Cantonese, the most widely spoken language among Hong Kong Chinese.

The discussions were co-facilitated by the first and third authors as moderators, both being local Hong Kong Chinese and having extensive expertise in conducting focus groups. The second author summarized participants' OPB experiences on a computer and projected them on a large screen to facilitate discussion. Each group discussion lasted 1.5 hours and was conducted and summarized by the same research team. Participants and the research team were seated around a large table. All discussions were audio-recorded by placing three mobile phones on the table, which ensured a clear recording of the voice of each participant.

At the start of each session, the third author outlined the objectives of the study and defined prosocial behavior and online prosocial behavior explicitly. Participants were then asked to brainstorm about general prosocial behavior, followed by online prosocial behavior in general and toward specific groups of people, including family and friends, people in their communities, strangers, and all human beings. To enrich the discussion, we included prosocial behaviors that participants had witnessed, rather than focusing solely on those they engaged in. This approach helps avoid limiting the scope of our analysis and reflects participants' knowledge of prosocial behavior as well as the specific types they are concerned with. Below is the list of questions used to guide and facilitate the discussion:

- Have you ever heard about prosocial behaviors? What do you think prosocial behaviors are?
- Have you ever witnessed or participated in any prosocial behavior, either online or offline?
- What and how do you typically do when you come across such opportunities?
- What kind of prosocial behaviors could be performed online to help others?
- What online prosocial behaviors could be done to help your family, friends, strangers, or all human beings?
- Could you please provide more details about how the online prosocial behavior you mentioned is performed?

During the discussion, the second author supported the process by capturing key phrases from participants and projecting them onto the screen. This approach facilitated the conversation's flow, because the two moderators leveraged these keywords to spur further discussion. At the end of each 90-min session, each participant was thanked and given a remuneration of HK$250 (i.e., USD $32) as compensation for their time and travel costs.

2.3. Coding and data analysis

The audio-recorded focus group discussion was transcribed verbatim into Cantonese by a research assistant who is a native Cantonese speaker and experienced in transcription. To ensure transcription accuracy, at

least 20% of the transcripts were cross-verified against the audio recordings by the first and corresponding authors. Following this, the transcripts were imported into NVivo software, and a systematic process of data coding and theme identification was conducted. Adopting Fereday and Muir-Cochrane (2006)'s approach, we employed a hybrid thematic analysis combining both deductive and inductive methods. This hybrid approach allowed us to explore potential categories that did not align with the existing theory, contributing to a more comprehensive understanding of online prosocial behaviors. The chart shown in Fig. 1 represents each stage of the coding process.

In Stage 1, a code manual was developed based on the research questions and Nezlek (2022)'s theoretical concepts of prosocial behavior. Two broad code categories, interpersonal and ideological prosocial behavior, were clearly defined and formed the code manual. These two categories guided the coding and theme formation in the deductive analytic process. In Stage 2, initial codes were developed and cross-checked by the first and second authors. Specifically, the transcripts of four focus groups were reviewed multiple times by the two authors, and keywords related to online prosocial behavior were highlighted as initial codes. The results were compared between the two authors to ensure agreement. In Stage 3, initial codes that encapsulate similar concepts were summarized and consolidated to form initial subthemes. For example, "sharing information about safety issues," "reminding family or friends of scams," and "sharing useful information to colleagues" were summarized as "sharing useful information." In Stage 4, these subthemes were assigned to either interpersonal or ideological prosocial behaviors, based on the definition in the code manual from Stage 1. For instance, "sharing useful information" was assigned to interpersonal theme, "injustice or immoral issues" was assigned to ideological theme. Meanwhile, inductive codes that did not align with the two existing concepts were organized into a novel theme beyond the established categories of prosocial behavior. In Stage 5, the final stage, the previous two stages were thoroughly scrutinized to ensure that the subthemes clustered accurately represented the overarching themes.

To ensure the trustworthiness and credibility of the data, several steps were undertaken during the coding process. First, the first and second authors independently developed codes across transcripts, using participants' own words to minimize bias. There was a 97% agreement between the coders on the codes. In addition, an audit trail was maintained throughout the coding process to document every decision made, ensuring transparency. After the initial coding phase, the first and second authors engaged in comprehensive discussions regarding all codes and themes. In cases where discrepancies were across the two coders, themes were reanalyzed and checked against other coded data until consensus was achieved. Peer debriefing sessions with colleagues (Cope, 2014) provided external feedback on our coding process. Finally, the themes and subthemes were refined and finalized, with exemplary quotes selected and translated into English to substantiate each identified theme.

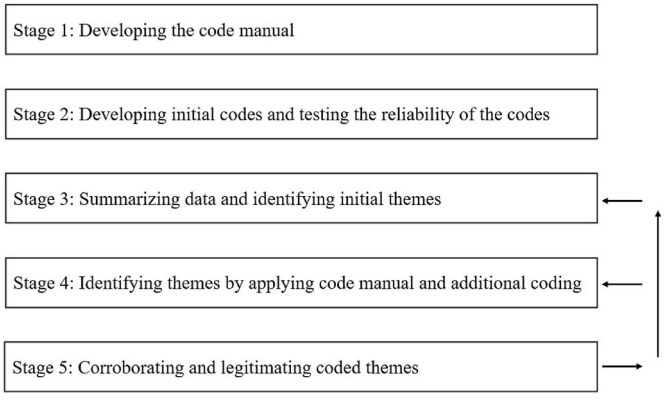

Fig. 1. Diagrammatic representation of the stages undertaken to code the data (adapted from Fereday & Muir-Cochrane, 2006).

3. Results

3.1. Qualitative analysis

The analysis of the verbatim transcript revealed that participants paid attention to different types of OPB. These OPB manifested in three main themes: 1) Interpersonal OPB, encompassing direct online helping behaviors intended to provide immediate benefits to specific individuals; 2) Ideological OPB, involving indirect online prosocial actions that aimed at benefiting collectives in the long run; and 3) Mixed OPB, comprising online acts of kindness that incorporate both interpersonal and ideological components. Ten subthemes were also identified, enriching our understanding of the nuanced expression of OPB. Table 2 provides a comprehensive summary of the themes, subthemes, and the aggregate count of codes referenced by participants across all discussions. To illustrate the essence of each theme, selected quotes from participants are presented below. Participants were divided into four age groups: G(18–29) for younger adults, G(30–44) for young-middle-aged adults, G(45–59) for middle-aged adults, and G(60+) for older adults. Male participants were denoted by "M" followed by a number (e.g., M1), whereas female participants were identified with "F" and an associated number (e.g., F2).

Table 3 shows the frequency and distribution of topics discussed by individuals across the four groups. To enrich our analysis, we performed a quantitative content analysis. This method allows us to quantify the qualitative data, revealing trends in participants' focus and emphasizing the significance of different themes across age groups. In general, the focus of participants was more likely to be on interpersonal OPB. Ideological OPB was discussed most frequently by younger adults (18.3%), followed by middle-aged adults (14.8%) and young-middle-aged adults (4.5%). Older adults did not mention ideological OPB at all during the focus group discussion. The proportion of discussion about interpersonal OPB was the highest among older adults (91.9%), followed by young-middle-aged adults (89.4%), middle-aged adults (85.2%), and younger adults (76.1%). Mixed OPB, incorporating elements of both interpersonal and ideological prosociality, was not mentioned by middle-aged adults but was discussed with similar frequency among the other three age groups. A chi-square test of independence was performed to examine the relationship between age groups and the frequency of themes mentioned. The results indicated a significant association between age groups and the frequency with which the three themes were mentioned, $\chi^2(6, N = 235) = 16.35$, $p = .012$. This suggests that the likelihood of mentioning certain themes varies significantly across different age groups. Below is a detailed overview of the main themes and subthemes identified.

Table 2
Themes and subthemes.

Themes	Subthemes	Total Times of Mention
Interpersonal OPB	Contributing personal knowledge and skills	56
	Sharing useful information	50
	Helping others to achieve some goals	37
	Providing emotional support	37
	Prosocial spending	11
	Sharing items	8
Ideological OPB	Injustice or immoral issues	12
	Environmental issues	6
	Historical conservation	4
	Equality of using free sources	3
Mixed OPB	/	11

Table 3
Frequency and distribution of the three themes across the four age groups.

Themes	Groups							
	G(18–29)		G(30–44)		G(45–59)		G(60+)	
	Times of mention	%	Times of mention	%	Times of mention	%	Times of mention	%
Interpersonal OPB	54	76.1	59	89.4	52	85.2	34	91.9
Ideological OPB	13	18.3	3	4.5	9	14.8	0	–
Mixed OPB	4	5.6	4	6.1	0	–	3	8.1

3.2. Themes and subthemes

3.2.1. Theme 1: Interpersonal online prosocial behaviors

Participants identified a variety of interpersonal prosocial behaviors that offered direct help or benefits to specific people online while bringing immediate benefits to others or emotional gratification to themselves. These behaviors could be categorized as interpersonal OPB. Six subthemes emerged under this theme: contributing personal knowledge and skills, sharing useful information, helping others to achieve some goals, providing emotional support, prosocial spending, and sharing items.

Subtheme 1.1: Contributing personal knowledge and skills. Several participants mentioned people sharing their skills and knowledge gained from personal experience with people online.

> G(18–29), M2: *The current development of technology allows more people to share their knowledge. For example, if you are good at design, you could discuss ways to improve your skills or offer some practical tips in social media groups.*

Participants also noted that people can use their experience and knowledge to help their friends or family with daily problems.

> G(45–59), M5: *When a family member is facing an exam-related issue, other members with experience in the same subject matter or those who are familiar with the difficulty of such an exam can provide help and support.*

Subtheme 1.2: Sharing useful information. This subtheme was frequently mentioned by different age groups, highlighting their dissemination of information or sources to their friends, family, colleagues, and even strangers in related interest groups.

> G(30–44), F6: *Sometimes you can share information such as incidents that have occurred near your home with other family members […] send a message asking them not to go to that specific area.*

> G(60+), M4: *There are some online projects that post videos of exercises online, then I can introduce them to my friends and ask them to do exercises together […], I can easily share the link with them and they can click on it.*

Subtheme 1.3: Helping others to achieve some goals. Participants noted that people can provide help when someone is striving to achieve a goal or has a need to accomplish something, such as raising money, promoting an event, completing a questionnaire, etc.

> G(18–29), M1: *As I am going to hold a talk, I have asked people on the Facebook page to help me promote the event by posting information about the talk.*

Participants also noted that the goal of finding lost items, pets, or people could be achieved through online platforms. People can share posts on social media websites to help reunite owners with their lost properties or help people locate missing family members.

> G(45–59), M5: *For example, if you lose your wallet somewhere on a bus at a particular time, then you can post it online and people can help you find it.*

Subtheme 1.4: Providing emotional support. The convenience of communicating through the Internet allows people to express their concerns and care for their family and friends online more easily. Participants said:

> G(30–44), M4: *Now we tend to communicate with our family or friends through WhatsApp groups, we usually talk to and care for each other in the group.*

A participant from another group also shared the same idea: "Some emotional friends may express their negative mood on Facebook, sometimes it can be helpful if you can leave a comment and encourage them to cheer up [G(45–59), M6]." He also noted that people even care for strangers online, for example:

> G(45–59), M6: *When parents post about their sick baby online, other parents will offer encouragement and leave supportive messages to cheer them up on the Internet.*

A participant from the older adult group noted that people can provide emotional support through online volunteering.

> G(60+), F1: *During the pandemic, the Chaplaincy Services Department of the hospital arranged Zoom meetings for volunteers to offer services to cancer patients and care for each other.*

Subtheme 1.5: Prosocial spending. Several participants noted that it is more convenient for people to donate money through online platforms than it has been in the past.

> G(45–59), M1: *In the old days, if you wanted to donate money, you would need to write a check, put it in an envelope, and then mail it. Now you do not need to do that, you can just click a button, and type in your credit card number, then the money will be transferred immediately.*

Some participants mentioned that people participate in fundraising for individuals in need.

> G(60+), F6: *Sometimes the church would share fundraising information through online groups or Zoom meetings, asking us to help poor children in remote mountainous regions, and then we would donate money to support their education.*

Subtheme 1.6: Sharing items. Some participants noted that people can share or exchange items they no longer need with others who may find them useful. The items may include books, household goods, furniture, etc.

> G(45–59), M1: *Donating second-hand things, for example, I donated my no-longer-needed wardrobe by putting it on the online platform to ask if anyone needed it. There are also apps or concern groups on Facebook for this.*

A participant from the young-middle-aged adult group also mentioned donating materials to people in disaster areas.

> G(30–44), M7: *When natural disasters such as floods or hurricanes strike mainland China, people in Hong Kong will generously donate many materials to the affected area.*

3.2.2. Theme 2: Ideological online prosocial behaviors

Participants identified several online prosocial behaviors aimed at

addressing global social issues and negative policies that could have undesirable outcomes over time. These behaviors fall under the category of ideological OPB. Four subthemes emerged under this theme: injustice or immoral issues, environmental issues, historical conservation, and equality of using free sources.

Subtheme 2.1: Injustice or immoral issues. Participants mentioned that people would share posts about injustice around the world or sign a petition to raise public concern and support those affected by the incident.

> G(45–59), M6: *There are some human rights groups that I am also following. When the incident happened in Afghanistan, you can join the petition to demonstrate your* support.

Participants in another age group also mentioned that people can speak up for the interests of consumers online when they have been impacted by unethical business practices.

> G(30–44), F6: *Some people who had negative shopping experiences with a service or product would create a Facebook group to disclose it, so that other people in the community would not suffer from similar issues.*

Subtheme 2.2: Environmental issues. Participants in the middle-aged group expressed specific concern and interest in environmental issues, particularly climate change.

> G(45–59), F8: *Many international environmental organizations have set up a division in Hong Kong, they usually repost some environmental information online to raise people's concern about important issues, such as climate change.*

> G(45–59), M5: *I remember the case of the Swedish girl (environmental activist Greta Thunberg) and her signature move of holding a sign with a slogan that gained substantial public attention. People helped her post it online to attract international concern and government attention.*

Subtheme 2.3: Historical conservation. Participants acknowledged that Facebook pages or concern groups play an important role in promoting historical conservation, disseminating valuable information, and even mobilizing the government to take concrete preservation measures.

> G(18–29), M1: *Some people or organizations would create a Facebook page to promote historical conservation, they may interview some elderlies and upload related history online […] When people find some mistakes in the content, they may help correct those errors and restore the historical facts by searching through the documents for accuracy.*

> G(45–59), M5: *The concern group of Central and Western District in Hong Kong managed to persuade the government to preserve Wing Woo Grocery, which is in the earliest Tong Lau (tenement buildings) in Hong Kong.*

Subtheme 2.4: Equality of using free sources. Some participants noted the significance of online open sources in providing people with equal access to information or knowledge.

> G(18–29), M7: *In the I.T. (Information Technology) world, there are many open sources for people to use for free.*

Participants in the young-middle-aged group shared similar views:

> G(30–44), M7: *I think sharing free software is also a kind of online prosocial behavior, in that I can create software and let everyone use it for free.*

3.2.3. Theme 3: mixed online prosocial behaviors

Certain participants discussed policy-related or social issues that demand public attention, such as animal protection, unfriendly behaviors, the situation of minorities, community policy, and information transparency. At first glance, these topics could be categorized as ideological OPB as they focus on the long-term benefits for collectives (Nezlek, 2022). However, the distinction between ideological OPB and mixed OPB is more nuanced, as it encompasses not only the long-term focus but also the immediate social dynamics they generate. Ideological OPB typically emphasizes broader societal goals and collective welfare, while mixed OPB incorporates elements that provide immediate social support or responses to urgent needs, thereby fostering a sense of community engagement. This dual nature allows mixed OPB to serve both immediate and long-term purposes. While these actions may provide immediate benefits, they also encompass elements typical of interpersonal OPB (Nezlek, 2022). Due to their dual nature, they were coded into a new theme named "mixed OPB."

One example came from a participant in the younger adult group who mentioned an online appeal to rescue animals at a local kennel where there was a lack of fire safety precautions to protect the animals. The appeal could raise public awareness of animal welfare in the long run, while the rescue itself brought immediate benefits to the dogs inside the kennel, demonstrating the characteristics of both ideological and interpersonal OPB:

> G(18–29), M7: *Once there was a fire at a kennel, some people made an appeal online, asking if anyone could provide help. Then many people drove to the kennel with cages and leashes to rescue the dogs inside.*

A participant from another age group also mentioned a website that provided instant information on COVID-19 cases during the pandemic. This served to warn people in the specific neighborhood to take immediate precautions, while also bringing long-term benefits to the collective by helping to control the spread of the virus in the community:

> G(30–44), F1: *I remember there was a website that allowed people to update instant information on COVID-19, such as the location of infected people and the number of cases. It is very convenient for people to be aware of the information and avoid being affected.*

Another participant in the older adult group also cited an example where community members shared their opinions in an online group about a construction project in their neighborhood. Participating in the online group not only offered immediate mutual social support but also generated valuable suggestions that could potentially influence government policies in the long run:

> G(60+), F6: *Recently the Highways Department planned to implement construction work in our community […] it would cause the two-way road to become one-way and clog up traffic during peak hours. Then people in the village started to voice their needs and give suggestions in the online group.*

4. Discussion

In contrast to previous research that has focused on prosociality in general in real-life settings (Cheng et al., 2017; Raposa et al., 2016), our qualitative study examined online prosocial behavior (OPB) guided by a new conceptual framework that distinguished interpersonal and ideological prosociality (Nezlek, 2022). We did this among four distinct age groups using semi-structured focus group discussions. Our hybrid approach of thematic analysis led to the identification of the third type of OPB, named mixed OPB, which expanded the current knowledge on prosociality in the online context. Our analysis also revealed potential age-related differences in these three types of OPB, contributing to a better understanding of online prosocial behaviors across different age groups.

In response to RQ1, although we found that the majority of online prosocial behavior could be categorized into either interpersonal or ideological framework, we also found that a few OPBs did not easily fit neatly into either category. These online prosocial behaviors involved both direct and indirect actions that benefited both specific individuals and collectives in both the short and long term. Hence, they were categorized into a new theme termed mixed OPB, representing a new

category of OPB that embodies the fundamental characteristics of both ideological and interpersonal OPB. This tripartite model of OPB was used to guide the analysis of the age-related differences in OPB in this study.

In response to RQ2, although we found the majority of OPB are interpersonal across all age groups, we found some differences among the age groups. Notably, older adults emphasized interpersonal OPB. In contrast, the younger adult group, while still predominantly engaging in interpersonal OPB, had the highest involvement in ideological OPB compared to all other age groups. These findings offer preliminary evidence of age-related differences in OPB.

We found that participants from the older adult group mentioning online prosocial behavior primarily about direct actions, such as teaching others, sharing useful information, and providing emotional support. This suggests that older adults may view the Internet as an extension of traditional offline prosocial behavior (i.e., interpersonal PB). In contrast, younger adults talked about prosocial behaviors in a broader spectrum such as addressing issues of injustice, protecting the environment, and conserving history through online petitions and advocacy. This implies that, in addition to using the Internet to extend the offline prosocial behavior (i.e., interpersonal PB), younger adults have a relatively greater capacity to have knowledge of other forms of prosocial behavior (i.e., ideological PB) in cyberspace.

These differences can be attributed to the distinct life experiences of different generational cohorts. In our study, the older adult group is comprised of members of the baby boomer generation (Dimock, 2019) who grew up during a time when online technologies were not widely, if at all, available. This may have left them feeling overwhelmed by the sudden proliferation of new technologies in their midlife. As a result, their utilization of the Internet tends to be limited in functionality, primarily focused on maintaining connections with family and friends (Wang et al., 2017).

Conversely, the middle-aged adult group and the young-middle-aged adult group, which largely correspond to Generation X and Millennials respectively, came of age during the rise of the Internet and the exponential growth of technological innovations, making them more at ease with technology and online experiences (Sia et al., 2022). Lastly, the younger adult group, which largely corresponds to Generation Z, grew up with ubiquitous Internet access and possesses an even greater familiarity with technology (Sia et al., 2022). Consequently, individuals from these three younger generations are more adept at leveraging technology to accomplish diverse tasks and goals, and are thus more likely to know about or be involved in ideological prosocial behaviors than the older adult group.

Moreover, the findings of the heightened ideological prosociality among the younger cohorts echoes the introduction's assertion about their stronger sense of global identity. This trend highlights how their enhanced digital literacy and early exposure to the Internet facilitate a deeper connection to global issues. Younger generational cohorts are hence more likely to prioritize global issues and actively pay attention to or engage in ideological prosociality in the cyberworld.

Another possible explanation for the greater attention to and mentioning of ideological OPB among the younger cohorts is their higher sense of control. People in various age groups hold different attitudes and beliefs regarding their ability to influence the world. There are age differences in levels of internal locus of control, which refers to people's beliefs in their ability to bring about an outcome through their actions (Rotter, 1966). Longitudinal data collected by Gatz and Karel (1993) found that internal locus of control decreases after middle age. Subsequent research also found that younger people tend to have higher levels of perceived control that decline with age (Mirowsky, 1995).

It is possible that younger individuals with higher perceived control have more confidence in participating in ideological prosociality and creating an impact on people around the world. Cleveland et al., 2005 claimed that the sense of control over some aspects of the external world motivates individuals to care about and improve those aspects. Previous research supports this notion, indicating that higher levels of perceived control are associated with volunteering and social participation (Curtis et al., 2016; Infurna et al., 2011).

Studies have also found that those with a higher internal locus of control have a higher perceived efficacy to influence the political system and are more active in politics (Cohen et al., 2001). The active participation of young people in social movements is also evident in Hong Kong. For instance, during the 2019 anti-extradition bill movement, which challenged a proposed law allowing extraditions to mainland China, the majority of demonstrators were young, with nearly half in their twenties and almost one-fifth in their thirties (Statista, 2019). These findings are consistent with our results that participants from younger generations were more concerned about social and political issues compared to the older adult group.

Contrary to our expectations, participants in the middle-aged group (ages 45–59) demonstrated a greater concern for ideological prosociality and had a particular focus on environmental issues, compared to the young-middle-aged group (ages 30–44). According to Erik Erikson's psychosocial development theory, individuals in middle adulthood will enter the generativity stage, characterized by the concern for and commitment to the next generation (Erikson, 1950). During this stage, generative adults will attend more to their contribution to the next generation and society as a whole (Peterson & Stewart, 1993). Hence, middle-aged adults might strive to contribute to a positive change in society and create a better environment for future generations (Ehlman & Ligon, 2012). Indeed, generativity has been found to be associated with pro-environmental attitudes (Barnett et al., 2019; Matsuba et al., 2012), as environmentalism is considered an important aspect of expressing generativity (Jia et al., 2016).

Interestingly, the older adult group did not exhibit the same level of environmental concern as the middle-aged group, possibly due to their limited ability to use the Internet to engage in non-interpersonal prosocial behavior. It may explain why the middle-aged group demonstrates a greater involvement in ideological prosociality with a special focus on environmental issues. To mobilize middle-aged and older adults in support of pro-environmental behavior, initiatives could focus on community-based programs that emphasize their generative role, such as local conservation projects or educational workshops on sustainable practices. Additionally, leveraging accessible technology and providing support for digital literacy can empower these groups to engage more effectively with online platforms that promote environmental initiatives. Engaging in generative activities can increase the well-being of these middle-aged and older individuals by fostering a greater sense of meaning and purpose in life, as well as enhancing their overall life satisfaction (Becchetti & Bellucci, 2021; Villar, 2012).

Although our findings indicate that the majority of OPBs are interpersonal in nature, younger adults showed greater concern for ideological OPBs than all other age groups. Such empirical evidence can be used to inform charitable organizations to tailor online campaigns for different age groups. To give an example, charitable campaigns that aim to end child poverty may target older audiences by adopting an interpersonal approach that emphasizes personalization and proximity, such as launching a child sponsorship program. Specifically, sponsors can choose a child according to certain criteria such as his/her name, age, gender, family background, and home country. Along with this, they will be sent photos and updates of the sponsored child, thereby developing a connection with them via electronic communication or virtual visits. These tangible outcomes of their prosocial behavior toward an individual may be particularly appealing to older adults.

In contrast, for the same goal of ending child poverty, charitable campaigns that target younger adults may adopt an ideological approach through hashtag activism, which is retweeting and sharing hashtags on social media to support various social causes, mobilize communities, and bring about positive social change (Ames & McDuffie, 2023). The use of hashtags allows netizens to spread awareness about child poverty throughout the world, opening up conversations around a

larger and collective effort to tackle the root cause of this problem. While this kind of hashtag activism may not bring immediate and direct benefits to impoverished children, it has the potential for more long-term success in advancing policies that prioritize child protection. Therefore, it may be especially appealing to younger audiences who are generally concerned about justice and equality.

To enhance motivation for prosocial behavior across all age groups, NGOs can incorporate gamification elements that reward users for participating in prosocial activities. For younger users, this might include social sharing, competitions, or challenges centred on ideological prosocial goals. For older adults, incentives can emphasize community impact, such as recognition for mentorship or direct support to individuals. Moreover, rewards can be designed to appeal to all age groups, featuring badges or points that signify collective achievements in prosocial actions and foster a sense of shared accomplishment. Online platforms should also focus on facilitating connections among users of different ages to promote cross-generational engagement in prosocial behavior. Features like mentorship programs, collaborative projects, and intergenerational challenges can enable younger users to learn from the experiences of older users while providing opportunities for older individuals to gain fresh perspectives from younger generations. By fostering these joint initiatives, platforms can cultivate a sense of community and shared purpose that resonates with all age groups, ultimately enhancing engagement in prosocial behavior.

However, as mentioned earlier, interpersonal prosociality is positively, whereas ideological prosociality is negatively, related to well-being (Nezlek, 2023). To battle the psychological and moral fatigue associated with ideological prosocial behavior, NGOs should encourage young people—who often have the time and flexibility due to fewer responsibilities such as not having children—to engage more in interpersonal prosocial activities, like volunteering. By highlighting the immediate impact of their efforts through stories of those who benefit directly, organizations can inspire action. Creating hands-on opportunities, such as community service projects and mentorship programs, can foster connection and promote responsibility. Utilizing social media to showcase these volunteering activities and incorporating skill development components can also attract participation. Building a sense of community among young volunteers through networking and recognition programs can motivate ongoing involvement. Lastly, educating young people about local needs will help encourage engagement in making a tangible difference. By engaging young people in interpersonal prosocial activities, we can enhance their well-being and create a more compassionate and interconnected community.

Our findings revealed that people of all ages are exposed to different kinds of prosociality on the Internet, which is in line with previous research indicating that advances in Web 2.0 technologies have provided new opportunities for the engagement of online prosocial behavior such as pro-environmental actions (Ballew et al., 2015). Nevertheless, along with the increase in online activities, cybercrimes such as scams and fraud are also on the rise, with older adults particularly vulnerable to such crimes (Federal Bureau of Investigation, 2022). It was reported that in 2021, people aged 60 years or above accounted for nearly a quarter of all cybercrime losses in the United States, to the amount of USD 1.7 billion—a staggering 74.4% increase from 2020 (Federal Bureau of Investigation, 2022).

Older adults' heightened susceptibility to online risks may be attributed to their limited digital literacy (Guess et al., 2020). As mentioned previously, they did not grow up with technology and may have only recently begun to adapt to digital technologies. As a result, they may face challenges in assessing the reliability of online information with their limited skills, making it easier for them to believe in misinformation. To help bridge the age gap in digital literacy and protect seniors against cybercrimes, government bodies, technology industry leaders, non-profit organizations, and education providers should offer digital literacy training programs for them. These programs would equip older individuals with knowledge and skills to identify online threats and evaluate information, enabling them to stay safe while engaging in prosocial behavior or other positive activities in the online world. Additionally, policymakers should rightly devise and implement cybersecurity policies that maintain a secure environment for seniors.

Our research reveals distinct patterns of prosocial behavior across different age groups in the online environments, highlighting the crucial role of digital platforms in fostering these behaviors. To enhance the effectiveness of online platforms, developers and platform managers should ensure that their designs are accessible, intuitive, and engaging for users of age groups. This could involve incorporating age-friendly features, improving user interfaces, and creating inclusive environments that encourage prosocial interactions. Furthermore, organizations and community leaders can leverage these platforms to promote prosocial campaigns tailored to different age groups, optimizing engagement and impact. It is also important to continually monitor how emerging technologies influence prosocial behavior, ensuring that digital tools remain adaptable and effective in fostering positive social actions across diverse demographics.

5. Limitations and future research

There are some limitations in our research that deserve further consideration. First, although our qualitative results provide significant implication about age difference in online prosocial behaviors, our results did not reflect participants' Internet usage frequency and digital literacy, which can be an influencing factor on people's knowledge of and access to various forms of online prosocial behavior. The current study was based on the online experience of respondents from Hong Kong—one of the most technologically advanced places in the world with an Internet penetration rate of 95.6%, far higher than the global average of 67.1% (Statista, 2024a). Since the digital divides can impede people's online prosociality (Naqshbandi et al., 2023), our data are not necessarily reflective of the experiences of most people in the world, or the relationship between Internet usage and online prosociality. To strengthen our knowledge of age disparities in online prosociality and the possible affecting factors, future research may expand to other countries with various levels of access to the web, and may also collect participants' Internet usage and digital literacy among these countries, such as the Ghana and Kenya which are in the middle (69.8%) and lower (40.8%) bands of Internet penetration rate (Statista, 2024a).

Second, our research findings were based on respondents from Hong Kong, who may not represent those in Mainland China due to significant cultural, social, and political differences. For example, recent research indicates that communist-authority priming can promote prosocial behavior among university students in Mainland China, as participants may feel they are being watched (Sheng et al., 2022). However, given that Hong Kong operates under capitalism whereas Mainland China is governed by socialism with Chinese characteristics (Boer, 2021), it is uncertain whether communist-authority priming would have the same effects on prosociality in Hong Kong as it does in Mainland China. Future research should compare diverse Chinese contexts to better understand how cultural and regional factors influence prosocial behavior.

Third, the themes and subthemes of our qualitative analysis were built upon the theoretical conceptualization of interpersonal and ideological prosociality (Nezlek, 2022), a model that awaits more empirical testing. Even though this model is conceptually sound and intellectually reasonable, the constructs of interpersonal and ideological prosociality rely solely on two and three items (benevolence and universalism, respectively) from the World Value Survey (Schwartz et al., 2012) as proxies. Although such value variables may be useful in depicting people's prosocial thoughts and beliefs, they may not accurately reflect people's actual prosocial behavior.

To provide stronger empirical support for the conceptual model, future research should develop and validate a psychometric tool that directly measures the constructs of interpersonal and ideological prosociality, covering both attitudinal and behavioral aspects. An original

and dedicated psychometric tool will enable the application of a quantitative approach to complement the qualitative findings of this study, providing more compelling empirical evidence for the conceptual model of interpersonal and ideological prosociality. Future research could also consider incorporating the third type of prosociality (i.e., mixed prosociality) into the dichotomous conceptual model of interpersonal and ideological prosociality, thereby deepening our understanding of the dimensionality of prosociality.

Lastly, although the present study provides a snapshot of the age difference in the experience of online prosocial behavior, it does not assess the psychological benefits or harms of such experience. Although the positive effects of prosocial behavior on well-being are well-documented, it is noteworthy that existing empirical evidence is mainly drawn from interpersonal prosociality (Hui et al., 2020; Son & Padilla-Walker, 2020)—the type of helping acts characterized by the direct relationship between actions, outcomes, and positive and immediate feedback, which is often worthy and rewarding, and thus, beneficial to well-being.

In contrast, ideological prosociality—the type of helping acts where the direct relationship between actions and outcomes is unclear, and positive and immediate feedback is rarely provided—may result in a sense of worthlessness and frustration, which may be detrimental to well-being. As discussed previously, a recent study (Nezlek, 2023) analyzed nine waves of the European Social Survey from 2002 to 2018 (ESS, 2021). The analyses found that endorsing interpersonal prosocial values was positively related to well-being (e.g., satisfaction with life), whereas endorsing ideological prosocial values was negatively related to well-being. Future research should explore the possible differential effects of these two types of prosociality on well-being, in both online and offline contexts.

6. Conclusion

In conclusion, our study has provided valuable insights into the nature of online prosocial behavior and the influence of age on individual engagement in such behaviors. Using a new framework of interpersonal and ideological prosociality to understand OPB, we have identified a new category of mixed OPB that captures the complexity of online helping acts. Furthermore, our study has revealed that interpersonal OPB is the most prevalent form of engagement across age groups, particularly among the older adult group. However, younger adults, while still primarily engaging in interpersonal OPB, also demonstrate a propensity for ideological OPB. These findings underscore the need for further research in the conceptual framework of prosociality and a deeper understanding of how individuals from different age groups navigate and contribute to online communities. Our results also highlight the importance of age-related factors in future research on online prosocial behavior, and our results may have implications for designing online prosocial campaigns and strategies such as those conducted by charitable organizations. Lastly, they can inform governments in devising policies related to online activities and in providing support for research on OPB.

CRediT authorship contribution statement

Algae Kit Yee Au: Writing – review & editing, Writing – original draft, Validation, Project administration, Methodology, Investigation, Data curation, Conceptualization. **Sophie Kai Lam Cheng:** Writing – review & editing, Writing – original draft, Visualization, Validation, Methodology, Investigation, Formal analysis, Data curation. **Wesley Chi Hang Wu:** Writing – review & editing, Investigation, Data curation. **David H.K. Shum:** Writing – review & editing. **John B. Nezlek:** Writing – review & editing. **Bryant Pui Hung Hui:** Writing – review & editing, Validation, Supervision, Methodology, Funding acquisition, Formal analysis, Conceptualization.

Funding

This study was supported by the General Research Fund 2020/2021 of the Research Grants Council, for the project "Doing Good Online: More Well-Being Benefit for Help-Givers and Less Harm for Others" [#17608420].

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

The data that has been used is confidential.

References

Ames, M., & McDuffie, K. (2023). In M. Ames, & K. McDuffie (Eds.), *Hashtag activism interrogated and embodied: Case studies on social justice movements*. Utah State University Press. https://doi.org/10.7330/9781646423187.

Amichai-Hamburger, Y. (2008). Potential and promise of online volunteering. *Computers in Human Behavior, 24*(2), 544–562. https://doi.org/10.1016/j.chb.2007.02.004

Armstrong-Carter, E., & Telzer, E. H. (2021). Advancing measurement and research on youths' prosocial behavior in the digital age. *Child Development Perspectives, 15*(1), 31–36. https://doi.org/10.1111/cdep.12396

Arnett, J. J. (2002). The psychology of globalization. *American Psychologist, 57*(10), 774–783. https://doi.org/10.1037/0003-066X.57.10.774

Bailey, P. E., Ruffman, T., & Rendell, P. G. (2013). Age-related differences in social economic decision making: The ultimatum game. *Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 68*(3), 356–363. https://doi.org/10.1093/geronb/gbx073

Ballew, M., Omoto, A., & Winter, P. (2015). Using Web 2.0 and social media technologies to foster pro-environmental action. *Sustainability, 7*(8), 10620–10648. https://doi.org/10.3390/su70810620

Barnett, M. D., Archuleta, W. P., & Cantu, C. (2019). Politics, concern for future generations, and the environment: Generativity mediates political conservatism and environmental attitudes. *Journal of Applied Social Psychology, 49*(10), 647–654. https://doi.org/10.1111/jasp.12624

Baruch, A., May, A., & Yu, D. (2016). The motivations, enablers and barriers for voluntary participation in an online crowdsourcing platform. *Computers in Human Behavior, 64*, 923–931. https://doi.org/10.1016/j.chb.2016.07.039

Batson, C. D., & Powell, A. A. (2003). Altruism and prosocial behavior. In *Handbook of psychology* (pp. 463–484). Wiley. https://doi.org/10.1002/0471264385.wei0519.

Bayram, A. B. (2019). Nationalist cosmopolitanism: The psychology of cosmopolitanism, national identity, and going to war for the country. *Nations and Nationalism, 25*(3), 757–781. https://doi.org/10.1111/nana.12476

Beadle, J. N., Sheehan, A. H., Dahlben, B., & Gutchess, A. H. (2015). Aging, empathy, and prosociality. *Journals of Gerontology Series B: Psychological Sciences and Social Sciences, 70*(2), 213–222. https://doi.org/10.1093/geronb/gbt091

Becchetti, L., & Bellucci, D. (2021). Generativity, aging and subjective well-being. *International Review of Economics, 68*, 141–184. https://doi.org/10.1007/s12232-020-00358-6

Boer, R. (2021). *Socialism with Chinese characteristics: A guide for foreigners*. Springer Nature.

Carpenter, J., Moore, M., Doherty, A. M., & Alexander, N. (2012). Acculturation to the global consumer culture: A generational cohort comparison. *Journal of Strategic Marketing, 20*(5), 411–423. https://doi.org/10.1080/0965254X.2012.671340

Carstensen, L. L. (2006). The influence of a sense of time on human development. *Science, 312*(5782), 1913–1915. https://doi.org/10.1126/science.1127488

Census and Statistics Department. (2024). Population by sex and age group. https://www.censtatd.gov.hk/en/web_table.html?id=110-01001.

Cheng, Q., Kwok, C.-L., Cheung, F. T. W., & Yip, P. S. F. (2017). Construction and validation of the Hong Kong altruism index (A-Index). *Personality and Individual Differences, 113*, 201–208. https://doi.org/10.1016/j.paid.2017.03.042

Cleveland, M., Kalamas, M., & Laroche, M. (2005). Shades of green: Linking environmental locus of control and pro-environmental behaviors. *Journal of Consumer Marketing, 22*(4), 198–212. https://doi.org/10.1108/07363760510605317

Cohen, A., Vigoda, E., & Samorly, A. (2001). Analysis of the mediating effect of personal-psychological variables on the relationship between socioeconomic status and political participation: A structural equations framework. *Political Psychology, 22*(4), 727–757. https://doi.org/10.1111/0162-895X.00260

Constitutional and Mainland Affairs Bureau. (2024). Basic law. Retrieved 15 October 2024 from https://www.basiclaw.gov.hk/en/index/index.html.

Cope, D. G. (2014). Methods and meanings: Credibility and trustworthiness of qualitative research. *Paper presented at the Oncology nursing forum*.

Curtis, R. G., Huxhold, O., & Windsor, T. D. (2016). Perceived control and social activity in midlife and older age: A reciprocal association? Findings from the German ageing

survey. *Journals of Gerontology Series B: Psychological Sciences and Social Sciences*. , Article gbw070. https://doi.org/10.1093/geronb/gbw070
Cutler, J., Nitschke, J. P., Lamm, C., & Lockwood, P. L. (2021). Older adults across the globe exhibit increased prosocial behavior but also greater in-group preferences. *Nature Aging, 1*(10), 880–888. https://doi.org/10.1038/s43587-021-00118-3
Dimock, M. (2019). *Defining generations: Where Millennials end and Generation Z begins*. Pew Research Center. Retrieved from https://www.pewresearch.org/short-reads/2019/01/17/where-millennials-end-and-generation-z-begins/. (Accessed 26 April 2023).
Dovidio, J. F., Piliavin, J. A., Schroeder, D. A., & Penner, L. A. (2017). *The social psychology of prosocial behavior*. Psychology Press.
Dunn, E. W., Aknin, L. B., & Norton, M. I. (2008). Spending money on others promotes happiness. *Science, 319*(5870), 1687–1688. https://doi.org/10.1126/science.1150952
Eagly, A. H. (2009). The his and hers of prosocial behavior: An examination of the social psychology of gender. *American Psychologist, 64*(8), 644–658. https://doi.org/10.1037/0003-066X.64.8.644
Ehlert, A., Böhm, R., Fleiß, J., Rauhut, H., Rybnicek, R., & Winter, F. (2021). The development of prosociality: Evidence for a negative association between age and prosocial value orientation from a representative sample in Austria. *Games, 12*(3), 67. https://doi.org/10.3390/g12030067
Ehlman, K., & Ligon, M. (2012). The application of a generativity model for older adults. *The International Journal of Aging and Human Development, 74*(4), 331–344. https://doi.org/10.2190/AG.74.4.d
Eisenberg, N. (1982). The development of prosocial behavior. In *Handbook of social development*. Academic Press.
Erikson, E. H. (1950). Childhood and society. In *Childhood and society*. Norton.
Erikson, E. H. (1985). *The life cycle completed: A review*. Norton.
Erikson, E. H., Erikson, J. M., & Kivnick, H. Q. (1989). *Vital involvement in old age*. Norton.
ESS. (2021). Source questionnaire | European social survey (ESS). https://www.europeansocialsurvey.org/methodology/ess-methodology/source-questionnaire.
Falco, A., Rattat, A.-C., Paul, I., & Albinet, C. (2023). Younger adults are more prosocial than older adults in economic decision making results from the give and take game. *Heliyon, 9*(7), Article e17866. https://doi.org/10.1016/j.heliyon.2023.e17866
Federal Bureau of Investigation. (2022). Elder fraud report 2021. https://www.justice.gov/file/1523276/download#:~:text=In/202021/2C/20over/2092/2C000/20victims,IC3/20Elder/20Fraud/20Annual/20Report.
Fereday, J., & Muir-Cochrane, E. (2006). Demonstrating rigor using thematic analysis: A hybrid approach of inductive and deductive coding and theme development. *International Journal of Qualitative Methods, 5*(1), 80–92. https://doi.org/10.1177/160940690600500107
Feygina, I., & Henry, P. (2015). Culture and prosocial behavior. In *The Oxford handbook of prosocial behavior* (pp. 188–208). Oxford University Press.
Freund, A. M., & Blanchard-Fields, F. (2014). Age-related differences in altruism across adulthood: Making personal financial gain versus contributing to the public good. *Developmental Psychology, 50*(4), 1125–1136. https://doi.org/10.1037/a0034491
Fu, X., Padilla-Walker, L. M., Nielson, M. G., Yuan, M., & Kou, Y. (2021). The effect of target's power on prosocial behavior: A cross-cultural ctudy. *Journal of Psychology, 155*(1), 115–128. https://doi.org/10.1080/00223980.2020.1845591
Gatz, M., & Karel, M. J. (1993). Individual change in perceived control over 20 years. *International Journal of Behavioral Development, 16*(2), 305–322. https://doi.org/10.1177/016502549301600211
George, J. J., & Leidner, D. E. (2019). From clicktivism to hacktivism: Understanding digital activism. *Information and Organization, 29*(3), Article 100249. https://doi.org/10.1016/j.infoandorg.2019.04.001
Gong, X., Zhang, F., & Fung, H. H. (2019). Are older adults more willing to donate? The roles of donation form and social relationship. *The Journals of Gerontology: Serie Bibliographique, 74*(3), 440–448. https://doi.org/10.1093/geronb/gbx099
Grønkjær, M., Curtis, T., De Crespigny, C., & Delmar, C. (2011). Analysing group interaction in focus group research: Impact on content and the role of the moderator. *Qualitative Studies, 2*(1), 16–30. https://doi.org/10.7146/qs.v2i1.4273
Guess, A. M., Lerner, M., Lyons, B., Montgomery, J. M., Nyhan, B., Reifler, J., & Sircar, N. (2020). A digital media literacy intervention increases discernment between mainstream and false news in the United States and India. *Proceedings of the National Academy of Sciences of the United States of America, 117*(27), 15536–15545. https://doi.org/10.1073/pnas.1920498117
Guo, M., Liu, H., & Yao, M. (2021). The Confucian value of benevolence and volunteering among Chinese college students: The mediating role of functional motives. *Sage Open, 11*(1), Article 21582440211006683. https://doi.org/10.1177/21582440211006683
Hackett, J. D., Omoto, A. M., & Matthews, M. (2015). Human rights: The role of psychological sense of global community. *Peace and Conflict: Journal of Peace Psychology, 21*(1), 47–67. https://doi.org/10.1037/pac0000086
Halcomb, E. J., Gholizadeh, L., DiGiacomo, M., Phillips, J., & Davidson, P. M. (2007). Literature review: Considerations in undertaking focus group research with culturally and linguistically diverse groups. *Journal of Clinical Nursing, 16*(6), 1000–1011. https://doi.org/10.1111/j.1365-2702.2006.01760.x
Hui, B. P. H., Ng, J. C. K., Berzaghi, E., Cunningham-Amos, L. A., & Kogan, A. (2020). Rewards of kindness? A meta-analysis of the link between prosociality and well-being. *Psychological Bulletin, 146*(12), 1084–1116. https://doi.org/10.1037/bul0000298
Infurna, F. J., Gerstorf, D., Ram, N., Schupp, J., & Wagner, G. G. (2011). Long-term antecedents and outcomes of perceived control. *Psychology and Aging, 26*(3), 559–575. https://doi.org/10.1037/a0022890
Jadin, T., Gnambs, T., & Batinic, B. (2013). Personality traits and knowledge sharing in online communities. *Computers in Human Behavior, 29*(1), 210–216. https://doi.org/10.1016/j.chb.2012.08.007
Jia, F., Soucie, K., Alisat, S., & Pratt, M. (2016). Sowing seeds for future generations. *International Journal of Behavioral Development, 40*(5), 466–470. https://doi.org/10.1177/0165025415611260
Jiang, X., Jiang, W., Cai, J., Su, Q., Zhou, Z., He, L., & Lai, K. (2019). Characterizing media content and effects of organ donation on a social media platform: Content analysis. *Journal of Medical Internet Research, 21*(3). https://doi.org/10.2196/13058
Kwak, N., Poor, N., & Skoric, M. M. (2006). Honey, I shrunk the world! The relation between Internet use and international engagement. *Mass Communication & Society, 9*(2), 189–213. https://doi.org/10.1207/s15327825mcs0902_4
Lee, M., Kim, H., & Kim, O. (2015). Why do people retweet a tweet?: Altruistic, egoistic, and reciprocity motivations for retweeting. *Psychologia, 58*(4), 189–201. https://doi.org/10.2117/psysoc.2015.189
Li, D., Cao, Y., Hui, B. P. H., & Shum, D. H. K. (2024). Are older adults more prosocial than younger adults? A systematic review and meta-analysis. *The Gerontologist, 252*, 1–22. https://doi.org/10.1093/geront/gnae082
Lockwood, P. L., Abdurahman, A., Gabay, A. S., Drew, D., Tamm, M., Husain, M., & Apps, M. A. J. (2021). Aging increases prosocial motivation for effort. *Psychological Science, 32*(5), 668–681. https://doi.org/10.1177/0956797620975781
Louie, K. (2010). Hong Kong on the move: Creating global cultures. In *Hong Kong culture: Word and image*. Hong Kong University Press.
Luengo Kanacri, B. P., Eisenberg, N., Tramontano, C., Zuffiano, A., Caprara, M. G., Regner, E., Zhu, L., Pastorelli, C., & Caprara, G. V. (2021). Measuring prosocial behaviors: Psychometric properties and cross-national validation of the prosociality scale in five countries. *Frontiers in Psychology, 12*, Article 693174. https://doi.org/10.3389/fpsyg.2021.693174
Macchia, L., & Whillans, A. V. (2021). The link between income, income inequality, and prosocial behavior around the world: A multiverse approach. *Social Psychology, 52*(6), 375–386. https://doi.org/10.1027/1864-9335/a000466
Matsuba, M. K., Pratt, M. W., Norris, J. E., Mohle, E., Alisat, S., & Mcadams, D. P. (2012). Environmentalism as a context for expressing identity and generativity: Patterns among activists and uninvolved youth and midlife adults. *Journal of Personality, 80*(4), 1091–1115. https://doi.org/10.1111/j.1467-6494.2012.00765.x
Matsumoto, Y., Yamagishi, T., Li, Y., & Kiyonari, T. (2016). Prosocial behavior increases with age across five economic games. *PLoS One, 11*(7), Article e0158671. https://doi.org/10.1371/journal.pone.0158671
Mayr, U., & Freund, A. M. (2020). Do we become more prosocial as we age, and if so, why? *Current Directions in Psychological Science, 29*(3), 248–254. https://doi.org/10.1177/0963721420910811
McCullough, M. E., Kimeldorf, M. B., & Cohen, A. D. (2008). An adaptation for altruism: The social causes, social effects, and social evolution of gratitude. *Current Directions in Psychological Science, 17*(4), 281–285. https://doi.org/10.1111/j.1467-8721.2008.00590.x
Mirowsky, J. (1995). Age and the sense of control. *Social Psychology Quarterly, 58*(1), 31. https://doi.org/10.2307/2787141
Morgan, D. L. (1996). Focus groups. *Annual Review of Sociology, 22*(1), 129–152. https://doi.org/10.1146/annurev.soc.22.1.129
Naqshbandi, K. Z., Jeon, Y.-H., & Ahmadpour, N. (2023). Exploring volunteer motivation, identity and meaning-making in digital science-based research volunteering. *International Journal of Human-Computer Interaction, 39*(20), 4090–4111. https://doi.org/10.1080/10447318.2022.2109246
Neves, B. B., & Mead, G. (2021). Digital technology and older people: Towards a sociological approach to technology adoption in later life. *Sociology, 55*(5), 888–905. https://doi.org/10.1177/0038038520975587
Nezlek, J. B. (2022). Distinguishing interpersonal and ideological prosociality: Introducing the construct of ideological prosociality. *New Ideas in Psychology, 65*, Article 100929. https://doi.org/10.1016/j.newideapsych.2021.100929
Nezlek, J. B. (2023). The costs of ideological prosociality: Analyses of the European Social Survey from 2002 to 2018 find negative relationships between endorsing universalistic values and well-being and social capital. *Applied Psychology: Health and Well-Being, 15*(1), 390–408. https://doi.org/10.1111/aphw.12385
Paarlberg, L. E., Nesbit, R., Choi, S. Y., & Moss, R. (2022). The rural/urban volunteering divide. *Voluntas: International Journal of Voluntary and Nonprofit Organizations, 33*(1), 107–120. https://doi.org/10.1007/s11266-021-00401-2
Pedersen, E. R., & Kurz, J. (2016). Using Facebook for health-related research study recruitment and program delivery. *Current Opinion in Psychology, 9*, 38–43. https://doi.org/10.1016/j.copsyc.2015.09.011
Penner, L. A., Dovidio, J. F., Piliavin, J. A., & Schroeder, D. A. (2005). Prosocial behavior: Multilevel perspectives. *Annual Review of Psychology, 56*, 365–392. https://doi.org/10.1146/annurev.psych.56.091103.070141
Peterson, B. E., & Stewart, A. J. (1993). Generativity and social motives in young adults. *Journal of Personality and Social Psychology, 65*(1), 186–198. https://doi.org/10.1037/0022-3514.65.1.186
Pew Research Center. (2022). Share of those 65 and older who are tech users has grown in the past decade. Retrieved from https://www.pewresearch.org/fact-tank/2022/01/13/share-of-those-65-and-older-who-are-tech-users-has-grown-in-the-past-decade/. (Accessed 26 April 2022).
Raposa, E. B., Laws, H. B., & Ansell, E. B. (2016). Prosocial behavior mitigates the negative effects of stress in everyday life. *Clinical Psychological Science, 4*(4), 691–698. https://doi.org/10.1177/2167702615611073
Raposo, S., Hogan, C. L., Barnes, J. T., Chemudupati, T., & Carstensen, L. L. (2021). Leveraging goals to incentivize healthful behaviors across adulthood. *Psychology and Aging, 36*(1), 57–68. https://doi.org/10.1037/pag0000428

Reysen, S., & Katzarska-Miller, I. (2018). *The psychology of global citizenship: A review of theory and research*. Lexington Books. https://rowman.com/isbn/9781498570305/the-psychology-of-global-citizenship-a-review-of-theory-and-research.

Rotter, J. B. (1966). Generalized expectancies for internal versus external control of reinforcement. *Psychological Monographs: General and Applied, 80*(1), 1–28. https://doi.org/10.1037/h0092976

Schwartz, S. H. (2006). A theory of cultural value orientations: Explication and applications. *Comparative Sociology, 5*(2–3), 137–182.

Schwartz, S. H., Cieciuch, J., Vecchione, M., Davidov, E., Fischer, R., Beierlein, C., Ramos, A., Verkasalo, M., Lönnqvist, J.-E., Demirutku, K., Dirilen-Gumus, O., & Konty, M. (2012). Refining the theory of basic individual values. *Journal of Personality and Social Psychology, 103*(4), 663–688. https://doi.org/10.1037/a0029393

Sheng, J., Luo, S., Jiang, B., Hu, Y., Lin, S., Wang, L., Ren, Y., Zhao, C., Liu, Z., & Chen, J. (2022). How prosocial behaviors are maintained in China: The relationship between communist authority and prosociality. *Frontiers in Psychology, 13*, Article 938468. https://doi.org/10.3389/fpsyg.2022.938468

Sia, P. H., Saidin, S. S., & Iskandar, Y. H. P. (2022). A conceptual model of emerging mobile travel apps for smart tourism among Gen X, Gen Y, and Gen Z. In A. B. Waluyo, & L. Tan (Eds.), *Mobile computing and technology applications in tourism and hospitality* (pp. 189–220). IGI Global. https://doi.org/10.4018/978-1-7998-6904-7.ch009.

Son, D., & Padilla-Walker, L. M. (2020). Happy helpers: A multidimensional and mixed-method approach to prosocial behavior and its effects on friendship quality, mental health, and well-being during adolescence. *Journal of Happiness Studies, 21*(5), 1705–1723. https://doi.org/10.1007/s10902-019-00154-2

Statista. (2019). Who are the Hong Kong protesters?. Retrieved 12 October 2024 from https://www.statista.com/chart/19222/demographic-profile-of-hong-kong-protesters/.

Statista. (2022). Countries with the highest Internet penetration rate as of July 2022. Retrieved 20 December 2022 from https://www.statista.com/statistics/227082/countries-with-the-highest-internet-penetration-rate/#:~:text=Leading/20online/20markets/20based/20on/20penetration/20rate/20July/202022&text=South/20Korea/2C/20the/20United/20Kingdom,July/202022/20was/2063.1/20percent.

Statista. (2023). Share of people among respective age groups who had smartphone in Hong Kong from June to September 2022, by age group. Retrieved 11 October 2024 from https://www.statista.com/statistics/1093389/hong-kong-share-of-people-in-respective-age-groups-who-had-smartphone/#:~:text=Share/20of/20people/20having/20owned/20smartphone/20Hong/20Kong/202022/2C/20by/20age/20group&text=From/20June/20to/20September/202022,in/20smartphone/20penetration/20since/202016.

Statista. (2024a). Countries with the highest internet penetration rate as of April 2024. Retrieved 12 October 2024 from https://www.statista.com/statistics/227082/countries-with-the-highest-internet-penetration-rate/.

Statista. (2024b). Distribution of Facebook users in Hong Kong in June 2024, by age group and gender. Retrieved 11 October 2024 from https://www.statista.com/statistics/1357667/hong-kong-facebook-user-age-distribution/.

Statista. (2024c). Distribution of Instagram users in Hong Kong in June 2024, by age group and gender. Retrieved 11 October 2024 from https://www.statista.com/statistics/1357695/hong-kong-instagram-user-gender-distribution/#:~:text=In/20June/202024/2C/20female/20users,outnumbering/20men/20by/20533/20thousand.

Svendsen, H., & Svendsen, G. T. (2016). Homo voluntarius and the rural idyll: Voluntary work, trust and solidarity in rural and urban areas. *Journal of Rural and Community Development, 11*(1), 56–72.

Sze, J. A., Gyurak, A., Goodkind, M. S., & Levenson, R. W. (2012). Greater emotional empathy and prosocial behavior in late life. *Emotion, 12*(5), 1129–1140. https://doi.org/10.1037/a0025011

van Lange, P. A. M., De Bruin, E. M. N., Otten, W., & Joireman, J. A. (1997). Development of prosocial, individualistic, and competitive orientations: Theory and preliminary evidence. *Journal of Personality and Social Psychology, 73*(4), 733–746. https://doi.org/10.1037/0022-3514.73.4.733

Villar, F. (2012). Successful ageing and development: The contribution of generativity in older age. *Ageing and Society, 32*(7), 1087–1105. https://doi.org/10.1017/S0144686X11000973

Villar, F., Serrat, R., & Pratt, M. W. (2023). Older age as a time to contribute: A scoping review of generativity in later life. *Ageing and Society, 43*(8), 1860–1881. https://doi.org/10.1017/S0144686X21001379

Wallace, P. (2015). *The psychology of the Internet*. Cambridge University Press.

Wang, K. H., Chen, G., & Chen, H.-G. (2017). A model of technology adoption by older adults. *Social Behavior and Personality: International Journal, 45*(4), 563–572. https://doi.org/10.2224/sbp.5778

Yang, Z., Fu, X., Yu, X., & Lv, Y. (2018). Longitudinal relations between adolescents' materialism and prosocial behavior toward family, friends, and strangers. *Journal of Adolescence, 62*, 162–170. https://doi.org/10.1016/j.adolescence.2017.11.013

Zeng, P., Nie, J., Geng, J., Wang, H., Chu, X., Qi, L., Wang, P., & Lei, L. (2023). Self-compassion and subjective well-being: A moderated mediation model of online prosocial behavior and gratitude. *Psychology in the Schools, 60*(6), 2041–2057. https://doi.org/10.1002/pits.22849

Zheng, X., Xie, F., & Ding, L. (2018). Mediating role of self-concordance on the relationship between Internet altruistic behaviour and subjective wellbeing. *Journal of Pacific Rim Psychology, 12*, Article e1. https://doi.org/10.1017/prp.2017.14