



Research article

Sustainable household capability of young adults: Role of parental norms

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ABSTRACT

This paper aims to investigate the influence of two types of parental norms, descriptive and injunctive, on young adults' sustainable attitudes and sustainable household capability through the application of the Knowledge-Attitude-Behaviour (KAB) theory. Empirical research was conducted by an online questionnaire on a sample of 356 young adults in Croatia aged 18 to 28. The results confirmed that young adults had high levels of sustainable knowledge and attitudes. They exhibited a high tendency towards saving water and energy, and a low tendency towards sustainable and green household purchases and recycling and reusing as integral practices of sustainable household capability. The results proved the adequacy of the KAB theory in the context of sustainable knowledge, attitudes, and behaviour, affirming the theory's assumptions in terms of sustainable household capability among young adults. The results also confirmed that young adults' sustainable knowledge had a strong significant positive impact on sustainable attitudes, that sustainable attitudes had a significant positive impact on sustainable behaviour in the context of sustainable household capability, and that sustainable knowledge had an indirect significant positive impact on sustainable behaviour in the context of sustainable household capability. Considering parental norms, the results confirmed a significant positive impact of descriptive parental norms related to sustainable parental behaviour on the practices constituting sustainable household capability of young adults. At the same time, injunctive parental norms were shown to have a limited impact on both attitudes and behaviours in the context of capability. Given that previous research brought contradictory and inconclusive findings that lead to misinterpretation in the research field, the results bring a comprehensive and transparent understanding and an overview of sustainable behaviour among young adults in the context of their sustainable household capability.

1. Introduction

The modern world is being disrupted by environmental pollution, overconsumption, and market inequality. There is a substantial need for radical changes. A sustainable lifestyle, as an aspiration to live in harmony with the habitat, allows consumers to participate in sustainable development, fulfil their potential and preserve the environment for future generations' [1]. Sustainable behaviour is indispensable for fighting further economic, social, and ecosystem usurpations on the global level, and to promote consumers' overall

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well-being [2]. To perform sustainable behaviour, individuals and households have to adopt desirable sustainable habits and achieve sustainable capability in the context of sustainable household activities such as water and energy consumption, recycling and reusing, and responsible and green purchase [3].

Following the concept of sustainable development on environmental preservation and the society, young adults represent a very important, new and upcoming market segment that forms the future generation's well-being [4]. Young adults also display a growing tendency towards sustainable patterns and show an elevated awareness regarding sustainable behaviour [5]. Although the importance of young adults within sustainable development is recognized, there is a lack of comprehensive research examining their sustainable behaviour. Until this point, research has only partially investigated sustainable behaviour of young adults, focusing solely on the aspect of sustainable household capability [6–10]. Consequently, there is a research gap on how young adults' sustainable behaviour can be encouraged and empowered. Young adults could have a great impact on the future society and environment through their present sustainable attitudes and behaviour [5]. Therefore, if their conduct is appropriately guided, it will result in favourable and enduring outcomes in the long term.

The most important socialization factor that leads young adults toward acquiring desirable norms is the parental influence [11–13]. Parents play a significant role in shaping and forecasting the diverse attitudes [14,15] and behaviours [16–18] of young adults. However, earlier research has primarily investigated the influence of parental norms among children and adolescents [19–23], with limited attention to young adults transitioning to living independently.

In order to address the detected research gap, the paper aims to examine the influence of two types of parental norms, descriptive and injunctive, on young adults' sustainable attitudes and behaviours as part of sustainable households through the application of the KAB (Knowledge-Attitude-Behaviour) theory. The objective is to investigate whether parents, through their sustainable practices and active promotion of desirable sustainable behaviour, can influence and empower young adults' sustainable household capability. Finally, the goal is to determine if the parents can stimulate young adults to create their own sustainable households and live sustainable lives in the future. Consequently, uncovering the mechanisms for creating sustainable households through parental norms could have highly positive effects on the society, the economy, and the environment on the global level.

2. Theoretical background

A sustainable lifestyle is key to preserving the human habitat for future generations. Sustainable living is defined as reduced usage of resources and minimized environmental interference [24] based on sustainable development as an individual's aspiration to meet their current needs without compromising the ability of future generations to meet theirs [1]. Therefore understanding, implementing, and conducting of sustainable lifestyle among young adults will enhance their efforts towards preserving social equilibrium. In order to understand and support young adults in leading sustainable lifestyles and their role in the sustainable household in the context of sustainable household capability, it is crucial to understand the relationship between their sustainable knowledge, attitudes, and behaviour [25], and influence those factors.

2.1. Sustainable household capability within the Knowledge-Attitude-Behaviour theoretical framework

Sustainable behaviour is defined as a coordinated series of activities intended to protect the environment and preserve resources, ensuring personal and social well-being of future generations [26,27]. To perform sustainable behaviour and to be part of sustainable households, young adults have to be capable of practicing sustainable activities. In a broader sense, capability as a behaviour determinant is defined as the capacity to engage in a specific activity or behaviour [28]. In a broader context, sustainable household capability refers to the extent of a household's involvement in sustainable behaviour, which includes the following components: water and energy consumption, sustainable and responsible household purchase, and recycling and reusing of products and materials [3]. To investigate the enhancement of sustainable household capability among young adults, it is essential to identify the factors that influence it.

The Knowledge-Attitude-Behaviour (KAB) theory is a consumer behaviour theory based on the premise that knowledge affects attitudes that lead toward behaviour change [29]. Therefore, knowledge has a direct impact on attitudes and an indirect impact on behaviour through attitudes. The theory had previously been applied in the study of sustainable behaviour but on an adult population [30,31]. Amoah and Addoah [30] found that environmental knowledge among adults positively influences pro-environmental behaviour in the context of ecological product usage and engagement in tree planting, cleaning the environment, efficient water usage, and efficient waste disposal. He et al. [31] detected a direct positive impact of subjective environmental knowledge among

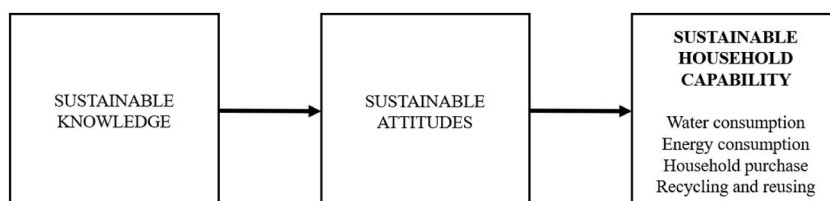


Fig. 1. The Knowledge-Attitude-Behaviour (KAB) theoretical framework.

adults on their attitudes toward waste sorting and an indirect positive impact on waste sorting.

Within the context of young adults, the theory has demonstrated its adequacy in the examination of desirable health-promoting behaviours [32,33]. Nevertheless, this framework has not yet been employed to study the sustainable behaviour of young adults. Considering the significance of the relationship between sustainable knowledge, attitudes, and behaviour in understanding and promoting a sustainable lifestyle [25], the Knowledge-Attitude-Behaviour theory could serve as a suitable framework for investigating sustainable behaviour among young adults as desirable behaviour, as well. The application of the framework is shown in Fig. 1.

On the other hand, the KAB theory has been criticized for its simplicity and lack of other relevant factors that could influence behaviour [34–37]. So, in order to broaden the scope of the theory, the research model included parents as the most significant socialization agent among young adults. Although the studies that applied the KAB theory to analyse sustainable behaviour among adults confirmed a significant and positive connection between knowledge, attitudes, and behaviour, other relevant studies in the context of sustainable knowledge, sustainable attitudes, and sustainable behaviour among young adults arrived at conflicting results [38–47]. Therefore, this research endeavour aims to contribute to the comprehensive understanding of the interaction mechanism between these variables.

2.2. Young adults as part of sustainable household

Young adults are demonstrating a growing interest in sustainable trends and an increased sensitivity in the context of sustainable behaviour as a significant driver of radical changes [5]. Sustainable behaviour among young adults is described as their sustainable practice and the desire to act sustainably [25,48]. Hence, sustainable household capability among young adults refers to the capacity to live a sustainable life by performing sustainable behaviour and by following sustainable government guidelines [3].

Sustainable household capability was predominantly investigated in the context of adults [3,49]. To date, published research has been partially investigating sustainable household capability of young adults, concentrating on a single element of water and energy preservation [7–9,40], sustainable and green purchase [6,10,41,42,50–55], and recycling and reusing [6,56–59].

As a specific element of sustainable household capability, young adults report high levels of awareness when it comes to the importance of sustainable practices in water consumption [8], but according to Ref. [9], their levels of informed and responsible water consumption are alarmingly low. The author confirmed that even if they practiced water conservation, young adults were driven by social responsibility, not by environmental concern.

In the context of energy usage, young adults are not prone to energy-saving [7], although they have developed strong positive attitudes toward preserving the environment [38,40]. With regard to encouraging water and energy saving, previous research has suggested enhancing environmental knowledge [60] and fostering personal norms [8], as well as moral responsibility to execute or avoid specific behaviours [61].

Pro-environmental and pro-social values play a crucial role in young adults' sustainable consumption behaviour in terms of sustainable household consumption and purchase [10]. According to Joshi and Rahman [62], the primary factors influencing sustainable purchase behaviour among young adults include the commitment to environmental responsibility, spirituality, and the perception of consumer effectiveness. On the other hand, their sustainable and green purchases are driven by ecological knowledge [63], as well as their support of environmental organizations [42]. Young adults' sustainable purchase behaviour could be fostered by strengthening the subjective norms [42,64], as well as social and emotional values [50]. Young adults as consumers are prone to buying eco-friendly, energy-efficient (6, 52, 55), and locally produced goods [53]. Also, they exhibit a heightened sensitivity to fair trade and ethical consumption [54]. In the context of food consumption, they prefer healthy food and seasonal fruits and vegetables [53]. Considering sustainable clothing consumption, young adults are driven by perceived values, sustainability commitment, uniqueness, acquisition from known sources, and lifestyle changes [51]. Nonetheless, as young adults mature, there is a noticeable trend of declining pro-environmental values and attitudes, while pro-environmental behaviours seem to become more prominent [65].

In terms of recycling and reusing, young adults report they perform sustainable behaviour by recycling used products [6] and through recycling materials such as plastic, metal, or glass [58]. They recycle in order to minimize their concerns about the environment and to increase their feelings of happiness and a sense of purpose [57]. Lastly, concerning the practice of reusing, young adults tend to prolong the lifespan of the products they already own and purchase previously owned products [56], but on the other hand, they are less inclined to waste reduction, as evidenced by their low levels of materials reuse and composting [59]. However, young adults play an important environmental role in waste reduction [66].

According to previous research [7,9,59], it can be inferred that, for the most part, young adults do not typically attain full sustainable household capability. While they are prone to recycling and sustainable purchases, and partially to reusing, they completely neglect others practices of sustainable households such as water and energy consumption. Therefore, sustainable household capability among young adults has to be strengthened. However, thus far, no research exists regarding the overall sustainable household capability of young adults.

The socialization of young adults, the process of their adjustment to the environment through acquiring desirable attitudes, norms, knowledge, and skills [11] may contribute to the improvement of their sustainable behaviour. Parents and family are the most important socialization agents for young adults [16–18]. Parental norms, encompassing both the actual behaviour of the parents and their expectations for their children to follow [67], have an enduring impact on young adults' behaviour [12,68]. Parental influence presents a strong determinant and a predictor of young adults' attitudes in the context of family structure [15] and financial well-being [14]. Also, a strong parental influence is detected in young adults' behaviour considering financial literacy and personal finance management [16,17]. That influence continues to be evident even after young adults leave parental household [18].

Parents, through their actions and behaviour, their approval of desirable behaviours, and their guidance shape the behaviour of

their children, and this influence persists even after the children have grown up and left their parental homes [18]. Seeing how young adults predominantly identify with their parents [69], parents form young adults' behaviour through socialization, they determine rules of behaviour, and lead discussions during decision-making processes [70]. Therefore, parents' actions and behaviours represent the foundation of young adults' decision-making process [71]. Living together or independently, parents and young adults who adopt sustainable lifestyle practices can create a sustainable household.

Considering the new trend in the context of family life cycle, young adults are leaving their parents' households later than ever before. Within the European Union, the average age at which young adults left their parental household is 26.5 years [72]. Furthermore, in the United States, one-third of individuals between the ages of 18 and 34 still live with their parents [73]. Hence, the evident impact of parents on young adults [15] could be attributed to extended coexistence.

Parental influence has a strong and positive impact on recycling and reusing among children, especially through sanctions, their own actions, and through communication [23]. Adolescents mostly agree with their parents' choices regarding sustainable consumption, especially in the context of apparel [20] and organic food [21]. Also, positive interactions between adolescents and their parents, centred around finding solutions and offering support, produce favourable effects in terms of problem-focused and meaning-focused coping strategies, ultimately fostering pro-environmental behaviours [74]. Among young adults, parental influence emerges as the third most significant predictor of sustainable consumption, after support of environmental organizations and attitudes toward sustainable development efforts [43]. The observed impact relies exclusively on self-reported perceptions of parental influence, taking into account solely the interactions between young adults and their parents.

Published research offers compartmental views, predominantly presenting insights into the parental influence on children's and adolescents' behaviours and attitudes. Even though the impact of parental influence on young adults' sustainable behaviour is great [43], a comprehensive study of their interaction is still lacking. Consequently, relevant studies have emphasized the need for further research on parental influence on young adults' sustainable behaviour [41,43]. Furthermore, the impact of parental influence on the behaviour of young adults has yet to be explored within the framework of sustainable household capability.

2.3. Research hypothesis development

With the aim of gaining an insight into the determinants of sustainable household capability among young adults, the research applied the Knowledge-Attitude-Behaviour (KAB) theory of behaviour change [29]. The hypotheses are formulated with attention to the interactions among the variables in the KAB model: sustainable knowledge, sustainable attitudes, sustainable household capability, and the mediating role of parental norms.

H1. Sustainable knowledge has a significant positive impact on young adults' sustainable attitudes.

To become a significant part of global sustainable development and achieve the benefits of sustainable lifestyle, as individuals and as part of households and the society as a whole, young adults have to acquire sustainable knowledge or knowledge of sustainable development, sustainable practices, and outcomes of a sustainable lifestyle [75]. According to Liang et al. [44], young adults have a relatively low level of environmental knowledge. According to Fang et al. [39], environmental knowledge, as part of environmental literacy, enhances an individual's self-motivated ability to engage in eco-friendly behaviours and influences the environmental attitudes of young adults. However, the correlation between these variables was quite weak. At the same time, Liang et al. [44] confirmed that higher levels of environmental knowledge strongly correlated with environmental attitudes and pro-environmental behaviour. Finally, according to Joshi and Rahman [41,42], perceived environmental knowledge, coupled with one's attitude towards green purchase, exerts a significant positive impact on green purchase behaviour of young adults.

H2. Sustainable attitudes have a significant positive impact on young adults' sustainable household capability.

When it comes to young adults, sustainable attitudes, a person's sustainable values and beliefs [76], represent their self-confidence in the performance of sustainable actions. Furthermore, as previously defined, sustainable household capability among young adults with regard to sustainable behaviour, refers to their capability to live sustainably, to perform sustainable practices, and to follow sustainable government guidelines [3]. According to Liang et al. [44], young adults display a moderate level of environmental attitudes and a relatively low level of environmental behaviour.

According to Lee [43], attitudes toward sustainable development efforts predict sustainable consumption behaviour among educated young adults. Joshi and Rahman [41,42] also found a significant positive connection between the attitudes toward sustainable and green purchase and sustainable and green purchase behaviour of young adults. Furthermore, Wu et al. [46] found that positive environmental attitudes lead to an increased tendency to use bicycles as a means of transport and engage in energy conservation and green purchases, which are considered pro-environmental behaviours. Taufique and Vaithianathan [45] detected a strong impact of environmental attitudes on environmentally conscious consumer behaviour. Finally [77], validated that pro-environmental attitudes served as predictors for both recycling and preservation intentions among young adults.

On the other hand, Young et al. [47] found a weak connection between attitudes toward environmental issues and sustainable consumption behaviours due to an attitude-behaviour gap. Diamantopoulos et al. [38] and Grønhoj and Thøgersen [40] emphasized that even if young adults had strong positive environmental attitudes, they did not practice energy-saving behaviour. Similarly, diverse findings in the context of the relationship between attitudes and behaviour could be explained by cultural differences such as a particular nation's attitudes towards family, nature, or money [78]. According to Gifford [79], the gap between consumers' attitudes and their actual behaviour can be attributed to a lack of awareness or knowledge of sustainability issues and their solutions, confusion or information overload regarding sustainable initiatives or messages, or to the inability to fully grasp the consequences of their

actions, and the tendency to conform to the behaviour of the majority.

H3. Parental norms have a significant positive impact on young adults' sustainable attitudes.

H4. Parental norms have a significant positive impact on young adults' sustainable household capability.

Parental norms are divided into descriptive and injunctive norms. Descriptive norms define young adults' perceptions of the parents' typical behaviour in specific situations, whereas injunctive norms refer to the perceptions of behaviour that parents would either approve or disapprove of [80]. In the context of sustainable behaviour, descriptive and injunctive norms have only been investigated in connection with young children and adolescents, who are in different developmental stages than young adults. Regarding adolescents, only descriptive norms have a significant impact on pro-environmental motivation and behaviour in the context of purchasing organic and environmentally friendly products and waste-separating practices [22]. Furthermore, in reference to children's behaviour, only descriptive parental norms are a strong predictor of recycling and reusing behaviour [23]. However, injunctive norms proved to be significant in relation to adolescents' attitudes toward physical activity and healthy diet [19].

Thus far, parental norms have not been thoroughly explored concerning the sustainable behaviour of young adults, despite the necessity for such investigation [43]; especially considering sustainable household practices. Given the strong influence of parental

Table 1

Overview of questionnaire items.

Sustainable consciousness scale – Sustainable knowledge [80]	
SK001	“Reducing water consumption is necessary for sustainable development.”
SK002	“Preserving the variety of living creatures is necessary for sustainable development (preserving biological diversity).”
SK003	“For sustainable development, people need to be educated in how to protect themselves against natural disasters.”
SK004	“A culture where conflicts are resolved peacefully through discussion is necessary for sustainable development.”
SK005	“Respecting human rights is necessary for sustainable development.”
SK006	“To achieve sustainable development, all the people in the world must have access to good education.”
SK007	“Sustainable development requires that companies act responsibly towards their employees, customers and suppliers.”
SK008	“Sustainable development requires a fair distribution of goods and services among people in the world.”
SK009	“Wiping out poverty in the world is necessary for sustainable development.”
Sustainable consciousness scale – Sustainable attitudes [80]	
SA002	“I think that we need stricter laws and regulations to protect the environment.”
SA003	“I think that it is important to take measures against problems which have to do with climate change.”
SA004	“I think that everyone ought to be given the opportunity to acquire the knowledge, values, and skills that are necessary to live sustainably.”
SA005	“I think that we who are living now should make sure that people in the future enjoy the same quality of life as we do today.”
SA006	“I think that women and men throughout the world must be given the same opportunities for education and employment.”
SA008	“I think it is important to reduce poverty.”
SA009	“I think that companies in rich countries should give employees in poor nations the same conditions as in rich countries.”
Sustainable household capability scale – Water consumption [3]	
WA001	“I avoid keeping the tap running when washing dishes.”
WA002	“I turn off the tap whilst cleaning my teeth.”
WA003	“I wait until I have a full load of laundry before washing.”
Sustainable household capability scale – Household purchase [3]	
HO001	“I try to buy energy-efficient household appliances.”
HO002	“I use environmentally friendly detergents whenever possible.”
HO003	“I use my own bag when I go shopping.”
HO004	“I buy products with as little packaging as possible.”
HO005	“I buy plants that require less water.”
HO006	“I avoid products in aerosol containers.”
HO008	“I buy local produce wherever possible.”
HO011	“I buy organic produce whenever possible.”
HO012	“I buy food from a store that I walk to.”
Sustainable household capability scale – Recycling and reusing [3]	
RE001	“I recycle glass, plastic bottles and cans.”
RE002	“I recycle newspapers.”
RE003	“I take old clothes to the charity shops.”
RE004	“I repair clothing.”
RE005	“I donate old household items to charity.”
RE006	“I compost my garden waste.”
RE007	“I compost kitchen waste.”
Sustainable household capability scale – Energy consumption [3]	
EN001	“I switch off lights in unoccupied rooms.”
EN002	“I put on an extra layer of clothing before turning up the heating.”
Descriptive parental norms [83]	
DPN001	“My parents live a sustainable lifestyle.”
DPN002	“My parents discuss sustainable lifestyle activities.”
DPN003	“My parents think a sustainable lifestyle is a good idea.”
Injunctive parental norms [83]	
IPN001	“My parents would support me in my intention to start living a sustainable lifestyle.”
IPN002	“My parents think I should start living a sustainable lifestyle.”
IPN003	“My parents would like me to start living a sustainable lifestyle.”

norms on adolescents' sustainable behaviour [20,21], it could be assumed that parental influence might exert a similarly significant impact on young adults in a broader context.

3. Methodology and sample structure

3.1. Research design

Empirical research involved using an online questionnaire on the sample of 356 young adults. The respondents were young adults aged 18 to 28. Research took place in the Republic of Croatia from April to May 2021, with the aim to investigate young adults' sustainable knowledge, sustainable attitudes, and sustainable household capability, together with the impact of descriptive and injunctive parental norms. The research was granted ethical approval from the Faculty Ethics Committee. Similarly, other relevant research studies in the field employed online questionnaires as an adequate methodology when examining sustainability among young adults [43,45,81].

The questionnaire consists of four sections, including previously tested and validated measurement scales. The first section includes the Sustainable consciousness scale, focusing on knowledge and attitudes, and covering three dimensions: environmental, social, and economic [82]. Due to the lack of validated measurement scales designed to evaluate the essential knowledge of young adults regarding sustainable household capability, we employed the Sustainable consciousness scale in order to examine their comprehension of sustainable development, which plays a vital role in their participation in sustainable household activities. Using the scale developed by Gericke et al. [82], sustainable knowledge was assessed using a set of nine items, while sustainable attitudes were measured through seven items. The economic aspect presents responsible market functioning and economic growth, the social aspect refers to social equity and cultural diversity, and the environmental aspect takes into account natural resources and climate change [83,84].

Table 2
Overview of sample structure.

	Total	Percentage		Total	Percentage
Sex			Living status		
Male	87	24.44%	Parental household	249	69.94%
Female	269	75.56%	Independently	26	7.30%
Age			Household with a roommate	25	7.02%
18	1	0.28%	Dorm	19	5.34%
19	21	5.90%	With a partner without children	26	7.30%
20	43	12.08%	With a partner with children	7	1.97%
21	76	21.35%	Other	4	1.12%
22	37	10.39%	Place of residence		
23	29	8.15%	Zagreb	142	39.89%
24	44	12.36%	Velika Gorica	73	20.51%
25	17	4.78%	Split	20	5.62%
26	36	10.11%	Karlovac	17	4.78%
27	34	9.55%	Osijek	15	4.21%
28	18	5.06%	Other cities	89	25.00%
Current employment status			No. of people in the household		
Student job	140	39.33%	1	10	2.81%
Permanent	47	13.20%	2	41	11.52%
Part-time	31	8.71%	3	79	22.19%
Freelance job	10	2.81%	4	117	32.87%
Volunteering	18	5.06%	5	69	19.38%
Missing	110	30.90%	6	25	7.02%
Education			7 and more	15	4.21%
Primary	3	0.84%	Current status		
Secondary	187	52.53%	Employed	80	22.47%
Bachelor's degree	74	20.79%	Unemployed	10	2.81%
Master's degree	92	25.84%	Student	266	74.72%
Mother's education			Father's education		
Primary	17	4.78%	Primary	10	2.81%
Secondary	194	54.49%	Secondary	213	59.83%
Bachelor's degree	57	16.01%	Bachelor's degree	54	15.17%
Master's degree	88	24.72%	Master's degree	79	22.19%
Average monthly personal income			Average monthly household income		
2000 HRK and less	135	37.92%	5000 HRK and less	24	6.74%
2001–6000 HRK	75	21.07%	5001–10,000 HRK	84	23.60%
6001–10,000 HRK	36	10.11%	10,001–15,000 HRK	75	21.07%
10,001 HRK and more	14	3.93%	15,001 HRK and more	78	21.91%
Missing	96	26.97%	Missing	95	26.69%

The second section discusses the sustainable household capability scale. Research included three items regarding water consumption, nine items regarding household purchase, seven items regarding recycling and reusing, and two items regarding energy consumption. The scale was taken over from Ref. [3] with the aim to examine young adults' behaviour as part of the sustainable household.

Items regarding descriptive and injunctive parental norms were adjusted according to the Theory of Planned Behaviour questionnaire [85]. Both descriptive and injunctive norms were measured using three items.

The overview of questionnaire items is presented in Table 1. Each item was measured using a 7-point Likert scale ranging from 1 ("Strongly disagree") to 7 ("Strongly agree"). The questionnaire concluded with a series of demographic questions.

3.2. Data collection and sample description

Research participants were chosen via purposive sampling and snowball sampling techniques. A similar approach has demonstrated its adequacy in previous studies related to sustainable behaviour in young adults, given its capacity to include a substantial portion of the youth population more efficiently [45,86,87]. The questionnaire was distributed through email and shared in online social media groups in which University of Zagreb students are members. Participants provided their consent just before initiating their involvement. An explicit question was made at the beginning of the study regarding respondents' agreement to participate in the questionnaire.

Furthermore, respondents who were first contacted gave additional recommendations for the recruitment of other respondents, who were their peers, and forwarded the questionnaire throughout the country. The method used was considered appropriate since the members were all young adults of the required age. The sampling technique was chosen to include both employed and unemployed young adults, not only students. During the distribution, the beginning of the questionnaire clearly emphasized the required age of the respondents in order to exclude those who were younger or older.

Of the total number of respondents, 75.56% were women, and 24.44% were men. The largest number of respondents, 21.35%, were 21 years old. Most respondents, 39.89%, were from Zagreb, 20.51% from Velika Gorica, 5.62% from Split, 4.78% from Karlovac, and 4.21% from Osijek. Currently, 69.94% of the respondents live in their parents' households. A total of 74.72% of the respondents were students. The respondents mostly held high school diplomas (52.53%). A total of 25.84% had master's degrees and 20.79% had bachelor's degrees. Their mothers (54.49%) and fathers (59.83%) mostly had high school diplomas. The largest number of respondents lived in households of four members (32.87%), with personal monthly incomes of 2000 HRK (260 EUR) or less (37.92%), and household monthly incomes between 5001 and 10,000 HRK (between 660 and 1330 EUR) (23.60%). The overall sample structure is presented in Table 2.

Table 3
Descriptive statistics.

Item indicator	Mean	St. Dev.	Item indicator	Mean	St. Dev.
Sustainable knowledge			Sustainable household capability		
SK001	6.05	1.251	Water consumption		
SK002	6.57	0.817	WA001	5.53	1.714
SK003	6.2	1.173	WA002	6.31	1.366
SK004	6.05	1.267	WA003	6.42	1.101
SK005	6.4	1.04	Recycling and reusing		
SK006	5.88	1.369	RE001	5.85	1.539
SK007	6.49	0.877	RE002	5.1	2.221
SK008	6.2	1.15	RE003	5.29	1.797
SK009	5.67	1.491	RE004	4.48	1.975
Sustainable attitudes			RE005	3.74	2.092
SA002	6.29	1.206	RE006	3.85	2.469
SA003	6.4	1.066	RE007	3.8	2.384
SA004	6.62	0.747	Household purchases		
SA005	6.49	0.933	HO001	4.69	1.803
SA006	6.79	0.631	HO002	4.09	1.822
SA008	6.51	0.954	HO003	5.57	1.541
SA009	6.17	1.231	HO004	4.35	1.605
Descriptive parental norms			HO005	3.22	1.876
DPN001	5.05	1.477	HO006	3.82	1.828
DPN002	4.17	1.800	HO008	5.17	1.549
DPN003	5.39	1.513	HO011	4.35	1.809
Injunctive parental norms			HO012	4.68	1.928
IPN001	6.12	1.263	Energy consumption		
IPN002	4.60	1.762	EN001	6.33	1.156
IPN003	4.57	1.806	EN002	5.21	1.869

4. Results

The study found a significant level of agreement (with mean values exceeding 5.5, where 7 signifies the highest agreement level) concerning statements related to sustainable knowledge and sustainable attitudes, particularly within the framework of individual and collective responsibility toward the environment and society, as well as the importance of equal opportunities. Regarding sustainable household capability, young adults expressed strong agreement (with mean values exceeding 5) when assessing all statements related to water consumption, all items related to energy consumption, but only a limited number of statements concerning household purchases and recycling and reusing. Table 3 presents descriptive statistics.

The proposed model is tested under the multivariate PLS-SEM method. This method is deemed adequate for exploratory research of testing new hypotheses [88]. The model consists of five first-order constructs. The reflexive variables are descriptive parental norms, injunctive parental norms, sustainable knowledge, and sustainable attitudes. The modelled formative variable is sustainability household capability. The reflexive variables are evaluated through the average variance extracted (AVE), composite reliability of indicators, and discriminant validity [88]. All average variances extracted are larger than 0.5 [89]. Composite reliability (CR) considers the variability of item loadings that should be greater than 0.7 and it is interpreted as the traditional Cronbach's alpha [88]. Cronbach's alpha for each variable is larger than 0.6, indicating that the variables in the model are valid and reliable. The validity and reliability of reflexive variables are shown in Table 4.

The discriminant validity of variables, shown in Table 5, is proven by using the Fornell and Larcker criterion [90]. The absence of multicollinearity is confirmed, as all square roots of AVE, on the main diagonal, are higher than its squared correlations with other variables in the model.

According to the Principal Component Analysis, in the context of the factor values formation and the scale reliability, all factors included in the model have factor loadings above 0.5 [91], indicating a strong degree of correlation between the items and their association with the factor.

To evaluate the adequacy and validity of the model, we calculated Cohen's coefficient, f^2 , which measures the strength of the effect of the individual endogenous variable on the exogenous variable [88]. According to the Stone-Geisser test [88], all of the values suggest relevant predictive validity (Q^2 being >0 for all variables in the model). Accordingly, we conclude that the model is adequate for the analysis of structural equations between latent variables. The results of the structural model are presented in Fig. 2 and Tables 6 and 7.

As shown in Table 6, only descriptive parental norms have a statistically significant, although somewhat modest, positive impact on sustainable household capability. Sustainable knowledge has a statistically significant and substantially positive influence on sustainable attitudes. Finally, sustainable attitudes have a significant yet somewhat modest positive impact on sustainable household capability. In Table 7, at a 5% level of statistical significance ($\alpha = 5\%$), we observed a statistically significant and mild positive effect of sustainable knowledge on sustainable household behaviour through sustainable attitudes, as evidenced by the p-value of less than 0.05 ($p = 0.014$).

5. Discussion

Based on the results, it can be concluded that young adults have high levels of sustainable knowledge and sustainable attitudes. In terms of their sustainable knowledge, they display highest levels in the environmental dimension, particularly in their understanding of natural resources and climate change. Conversely, when it comes to sustainable attitudes, they exhibit highest levels in the social dimension, notably in their attitudes towards social equity and cultural diversity. The insights provided contradict the previously observed trend of declining pro-environmental values and attitudes [65]. However, it could be concluded that young adults' sustainable consciousness increases, as well as its importance for the achievement of environmental, social, and economic equilibrium. This contradicts earlier research that portrayed young adults as having limited sustainable knowledge and moderate sustainable attitudes [44].

Considering the practices contributing to sustainable household capability, the results show young adults as inclined to save water and energy. However, these results deviate from prior research findings. Previous research found that young adults did not practice water and energy saving even though they had positive attitudes towards those practices [7,9], due to an attitude-behaviour gap [38, 40]. However, according to the research conducted, there is no attitude-behaviour gap considering saving water and energy. Furthermore, following the results, young adults have a moderately low level of tendency towards sustainable and green household purchase. Given that they show a high level of sustainable attitudes and a moderately low level of behaviour in the context of sustainable and green household purchases, there is a noticeable attitude-behaviour gap confirmed by previous findings [47]. Hence, it

Table 4
Validity and reliability of variables in the model.

	Cronbach's Alpha	rho_A	Composite Reliability	AVE
Descriptive parental norms	0.830	0.835	0.898	0.746
Injunctive parental norms	0.806	0.826	0.888	0.727
Sustainable knowledge	0.705	0.729	0.834	0.627
Sustainable attitudes	0.622	0.670	0.794	0.567
Sustainable household capability		1.000		

Table 5
Discriminant validity of reflexive variables in the model.

	Descriptive parental norms	Injunctive parental norms	Sustainable knowledge	Sustainable attitudes
Descriptive parental norms	0.864			
Injunctive parental norms	0.733	0.853		
Sustainable knowledge	0.140	0.116	0.792	
Sustainable attitudes	0.061	0.075	0.578	0.753
Sustainable household capability	0.442	0.350	0.223	0.219

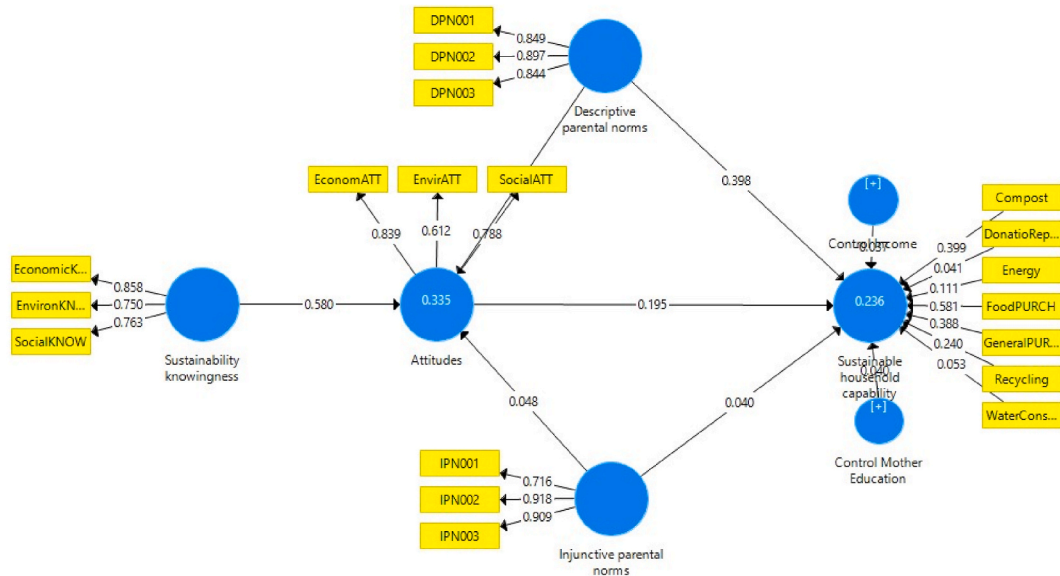


Fig. 2. Results of the PLS-SEM structural equation model.

Table 6
Direct effects of variables in the PLS-SEM model.

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
Descriptive parental norms → Sustainable attitudes	-0.055	-0.053	0.064	0.869	0.385
Descriptive parental norms → Sustainable household capability	0.387	0.392	0.075	5.154	0.000
Injunctive parental norms → Sustainable attitudes	0.049	0.048	0.059	0.816	0.415
Injunctive parental norms → Sustainable household capability	0.052	0.061	0.072	0.716	0.474
Sustainable knowledge → Sustainable attitudes	0.58	0.586	0.042	13.826	0.000
Sustainable knowledge → Sustainable household capability	0.113	0.114	0.046	2.475	0.014
Sustainable attitudes → Sustainable household capability	0.195	0.195	0.077	2.544	0.011

Table 7
Indirect effects of variables in the PLS-SEM model.

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
Injunctive parental norms → Sustainable attitudes → Sustainable household capability	0.009	0.01	0.014	0.689	0.491
Sustainable knowledge → Sustainable attitudes → Sustainable household capability	0.113	0.114	0.046	2.475	0.014
Descriptive parental norms → Sustainable attitudes → Sustainable household capability	-0.011	-0.011	0.014	0.752	0.452

could be concluded that sustainable purchase might be determined by other relevant factors such as environmental responsibility, spirituality, and the perception of consumer effectiveness [62].

The results indicate that young adults are unlikely to purchase environmentally friendly and energy-efficient products, in contrast to earlier studies conducted on this topic [6,53,55]. Young adults only reported that they choose reusable shopping bags and exhibited a tendency to purchase local and domestic products, aligning with previous research findings [53]. Viewed in the context of recycling and reusing, young adults reported that they recycle materials, repurpose glass, and donate clothes, consistent with earlier research results [6,58,77]. Regarding the results of the research conducted on sustainable and green household purchase, as well as recycling and reusing, it could be inferred that young adults tend to minimize waste, which is in contrast with previous research findings [59]. Nonetheless, the results confirmed that young adults exhibit a degree of inclination toward practices that contribute to sustainable household capability. Accordingly, it could be concluded that their understanding of sustainability and their sustainable attitudes do not necessarily translate into sustainable behaviour in the context of sustainable household capability on a broader scale.

The research results proved the adequacy of the KAB theory in the context of sustainable knowledge, attitudes, and behaviour, and confirmed its assumptions in the context of sustainable household capability among young adults. Therefore, the results follow previous research studies that applied the KAB theory in the context of sustainability among adults [30,31] and in the context of health-promoting behaviour among young adults [32,33]. The results confirmed that young adults' sustainable knowledge had a strong significant positive effect on sustainable attitudes, that sustainable attitudes had a significant positive effect on sustainable behaviour in the context of sustainable household capability, and that sustainable knowledge had an indirect significant positive effect on sustainable behaviour in the context of sustainable household capability.

The results confirmed that young adults' sustainable knowledge had a strong significant positive effect on sustainable attitudes. The findings presented align with previous research that has demonstrated strong positive impact of environmental knowledge on environmental attitudes among young adults [44]. However, they contrast the studies that have identified a weak connection between those variables [39].

Considering sustainable attitudes, the results confirmed that young adults' sustainable attitudes had a significant positive effect on sustainable behaviour in the context of sustainable household capability. The results follow previous findings that confirmed the positive effect of sustainable attitudes on sustainable behaviour considering sustainable consumption [43], sustainable and green purchases [41,42], ecologically conscious consumer behaviour [45], cycling in the context of sustainable transport [46], and recycling and preservation intentions [77]. On the other hand, the results are not in accordance with previous research studies that have found a weak connection between the aforementioned variables [47], or no connection at all, due to the attitude-behaviour gap [38,40].

In addition to the direct impact of sustainable knowledge on sustainable attitudes, the results also demonstrated an indirect effect of sustainable knowledge on sustainable behaviour in the context of sustainable household capability. The results regarding indirect impact are consistent with previous research that has found a significant effect of ecological and environmental knowledge on sustainable and green purchase behaviour [41,42,63], and pro-environmental behaviour [44]. Previous research has yielded conflicting, perplexing, and inconclusive findings that lead to misinterpretation in the research field. It could be concluded that the current findings bring a comprehensive and transparent overview and enhance our understanding of sustainable behaviour among young adults and their sustainable household capability.

In the context of descriptive parental norms, young adults reported that their parents mostly led sustainable lives and viewed sustainable lifestyles favourably. Given that parents' behaviour strongly influences the behaviour of young adults [71], it results in a significant positive impact of descriptive parental norms on sustainable household capability of young adults. Regarding injunctive parental norms, although young adults believe that their parents would support them in their intention to start living a sustainable lifestyle, there is no discernible effect of these injunctive parental norms on young adults' sustainable household capability. Furthermore, neither the descriptive nor the injunctive parental norms exhibit a significant impact on the sustainable attitudes of young adults. Consequently, these results diverge from previous research findings [15]. Parental norms were found to play a significant role in shaping adolescents' attitudes regarding their physical activity and healthy dietary habits [19]. Nevertheless, taking into consideration that adolescents and young adults are in different cognitive developmental stages, parents only influence the sustainable behaviour of young adults through their own actions. Therefore, it can be concluded that sustainable attitudes of young adults are primarily shaped by factors other than parental norms. These factors include sustainable knowledge [31,39], an understanding of sustainable practices and outcomes referred to as sustainable awareness [79], and cultural values [78].

6. Conclusion

The paper aimed to investigate the influence of two types of parental norms, descriptive and injunctive, on young adults' sustainable attitudes and behaviour in the context of sustainable household capability, through the application of the KAB (Knowledge-Attitude-Behaviour) theory. The study provides a comprehensive and transparent overview of sustainable behaviour among young adults and their sustainable household capability. The findings revealed that young adults possess a high level of sustainable knowledge and attitudes. They demonstrate an inclination to save water and energy, but display a low level of a tendency towards recycling and reusing and sustainable and green household purchase. Considering parental norms, there is a significant positive impact of descriptive parental norms on the sustainable household capability of young adults. Finally, the research proved the assumptions of the KAB theory in the context of sustainable household capability among young adults.

The research findings emphasize the significance of studying, understanding, and adopting sustainable lifestyles among young adults. National policies need to actively promote sustainable lifestyles among young adults and motivate them to create their own sustainable households as they gain independence. Policymakers need to foster equal opportunities for young adults both on the

national and global levels, to enhance the well-being of individuals, households, national economies, and the global community. The results could also help individuals recognize the significance of their personal sustainable knowledge, attitudes, and sustainable household capability in the context of performing sustainable practices and considering the implications of their present actions for the well-being of the future society and future generations. Finally, considering theoretical implications, the findings establish a solid foundation for defining sustainable household capability among young adults.

The research's principal limitation stems from it being focused exclusively on the territory of the Republic of Croatia. Further research should consider the possibility of broadening the scope of the investigation to encompass more countries, and include their varying stages of development stages, living standards, national sustainability initiatives, environmental values, and the overall awareness of sustainability within the research. This way, it would enable the identification of any noticeable and significant differences between findings. Incorporating a larger number of countries in the research would result in a larger sample, enabling easier country-to-country comparisons and identifying the potential causes of variations in the results. Moreover, the study employed the snowball sampling method, which has the potential to introduce sampling bias due to its reliance on participants recommending individuals from their own social networks. Hence, further research should employ a randomized sampling approach to increase the potential for generalization of the findings to a wider population. In addition, future research could explore whether notable distinctions exist between young adults residing in their parents' households and those living independently. Finally, only descriptive and injunctive parental norms were examined as predictors of sustainable attitudes and sustainable behaviour among young adults in the context of parental influence. Future research should include the dimension of cultural differences, religion, and other variables such as personal traits, emotional intelligence, gender, income level or employment of young adults, and educational status of both young adults and their parents.

In the context of future research, it is recommended to bring a comprehensive and synthesized review of national policies per country focused on strengthening sustainable knowledge of children, adolescents, and young adults through sustainable educational efforts. Therefore, future research could highlight the best practices, emphasize the practices that should be avoided and prescribe recommendations for empowering sustainable education on both the national and global levels. Also, further research should consider media, as an important agent of socialization, in the context of transmitting sustainable knowledge to young adults. Future research should also define specific elements of sustainable education in order to evaluate their implementation in educational institutions. The future investigation should include adolescents and children as a separate sample and investigate if parental norms have a significantly different effect considering young adults' age, gender, income, education, employment and living status. Finally, in order for national policies to be efficiently developed, implemented, and evaluated, it is recommended to define the term of sustainable behaviour among young adults and its determinants according to consumer behaviour theories.

Data availability statement

The data associated with this study has not been deposited into a publicly available repository. The data presented in this study are available on request from the corresponding author.

Ethics committee approval

This study was reviewed and approved by the Institutional Ethics Committee of Faculty of Economics and Business, University of Zagreb, Croatia, with the approval number: protocol code 251-56-31-22-11; Nov 23, 2022.

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Informed consent statement

All participants provided informed consent to participate in the study.

CRediT authorship contribution statement

Andrea Lučić: Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization. **Marija Uzelac:** Writing – review & editing, Writing – original draft, Visualization, Validation, Supervision, Software, Resources, Project administration, Methodology, Investigation, Funding acquisition, Formal analysis, Data curation, Conceptualization.

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.

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