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Considering the Role of Behaviours in Sustainability and Climate Change Education

Efrat Eilam

Abstract. At the heart of sustainability and climate change education discourse is the notion of student behavioural change, as an emphasised goal. The central positioning of behaviour modification is peculiar and atypical in educational discourse at large. This approach raises moral and ethical concerns, as well as concerns regarding the impacts on student well-being. In addressing these issues, this conceptual paper interrogates the role ascribed to student behaviour in sustainability education (SE) and climate change (CC) education. The discussion begins by providing an overview of the various ways by which behaviour is conceptualised in the literature, including discussing the roles of behaviour as a goal and as a mean; and the debate concerning individual behaviour versus collective action. Next, multiple lenses are applied to critique the behavioural modification approach and discuss its impact on student well-being. This interrogation gives rise to four clusters of associations between students' behavioural change, the acquisition of CC knowledge and student well-being. Finally, it is proposed to reframe the role of behaviour and to conceptualise behaviour as forming part of ethics education, where the focus shifts from assigning behaviour an instrumental role to conceptualising its intrinsic educational value.

Key words: Climate change education, sustainability education, behaviour, collective action, climate action.

Introduction

Notions such as *behavioral change* (Kwauk, 2020), student *activism* (Graham-McLay, 2020) and student *climate action* (Jorgenson et al., 2019), are central to the sustainability education (SE) (Educational, Scientific and Cultural Organization [UNESCO], 2017) and climate change (CC) education discourse. At the heart of this discourse is the idea that the role of education is to change students' behaviours. This idea is manifested across extensive SE publications to the extent that UNESCO (2017, 2019a) regards behavioural change as a learning dimension on its own right. This central role of behaviour is highly unusual in educational discourse, particularly in curricular documents. While curricula often emphasise capacities development, it is quite unusual for any curriculum to claim upfront the need to

change student behaviour as an educational goal, nor to regard behaviour as a central learning dimension in the curriculum. The peculiar role of behaviour in SE and climate change (CC) education forms the motivation for this conceptual paper. This central positioning of behaviour solicits in-depth examination of this educational approach from various lenses, including its educational theory underpinning, and its empirical educational efficacy. Furthermore, the approach raises moral and ethical concerns, as well as concerns regarding the impacts on student well-being. In addressing these issues, this paper aims to interrogate the role ascribed to student behaviour in SE and CC education, by examining and critically discussing a range of SE and CC education literature.

The paper begins by first discussing the conceptualisation of behavioural change as a means and as a goal. This is followed by presenting empirical evidence regarding the efficacy of the approach. It continues to discuss the literary debate regarding individual behaviour change *versus* collective action. This is followed by presenting a range of literature criticising the behavioural change approach, using different lenses for examination. The literature is further interrogated to examine the relationships between behavioural change and other educational outcomes, including knowledge acquisition, attitudes and emotions. The analysis gives rise to four clusters of associations between students' behavioural change, the acquisition of CC knowledge and student well-being. These associations and their theoretical underpinnings are discussed. Finally, I offer a different lens for reframing the role of behaviour in CC education.

Before progressing further, it is worth noting here, that my intention in this paper is to contribute primarily to the field of CC education. However, since the roots of CC education are so heavily tied up with SE, it is not possible to address the role of behaviour in CC education without discussing the conceptualisation of behaviour in SE. Regarding the use of terms, in this paper the term SE is used interchangeably as a generalist term, encompassing a range of terms used for addressing the broad field, spanning across environmental education, education for sustainable development (ESD) global citizenship education, education for environmental sustainability (EES) and others. The term CC education is considered here as separate and distinguishable from SE. However, the question of whether CC education is independent from SE, is contested and unresolved in the literature. While SE literature proclaims to include CC as a theme of sustainability (UNESCO, 2021a), some researchers suggest addressing CC education as a field on its own right (Eilam, 2022).

Behavioural Change Conceptualisation in Sustainability Education Literature

Behavioural change forms a primary goal in SE (Rousell, & Cutter-Mackenzie-Knowles, 2020). The idea that the learning outcomes of education should include the changing of students' behaviour or encouraging them to take actions has its roots in the early conceptualisation of environmental education. The 1978 Tbilisi Declaration stated as a goal for environmental education to “create new patterns of behaviour of individuals...” (UNESCO, 1978). Later in the 1980's following debates as to whether or not it is ethical for schools to prescribe behavioural goals, particularly when the desired behavioural outcomes are unclear and contested at times, a new educational model was proposed, shifting the educational goals from prescribed behaviours to what was termed Action Competence (Mogensen & Schnack 2010). This softer approach, while continuing to focus on students' behaviour in relation to their social and physical environment, put more emphasis on the development of capacity to act in the public sphere, rather than on prescribing the desired behaviours. However, Blum et al. (2013) reported that in the United Kingdom both approaches were contested, and it was debated whether schools should be allowed to teach for behaviour, as opposed to helping students to deal with arising uncertainties. However, in current SE literature, behaviour continues to play a central role, where the most prevailing approach is to conceptualise households and schools as “the primary contexts for action and children and youth the primary agents of change” (Jorgenson et al., 2019, p. 165).

In SE literature, behavioural change plays a dual role. It serves both as means to achieve other SE goals, and as a goal on its own right. As means, the basic idea is that if every person changes their behaviour, the world will become sustainable, thus the goal of sustainability may be achieved, through individuals' responsible behaviours. Additionally, individual behavioural change serves as means for mobilising societal change. Thus, individual behaviour has two main manifestations, at the personal household level, where students need to change their individual daily behaviour; and at the societal level, where students are expected to mobilise change in society, what is often referred to as *agents of change* (Jorgenson et al., 2019).

As a goal, the rationale for behavioural change is that focusing on students' everyday behaviour enables to empower students, increase a sense of agency, and prevent a sense of despair and helplessness (Jorgenson et al., 2019). According to this perception, CC education needs to focus on “‘local, tangible and actionable’ aspects of climate change that can be ‘addressed by individual behaviour’ (Anderson, 2012, p. 197)” (Jorgenson et al., 2019, p. 165)

These conceptualisations of the roles of behaviour, as a goal and as a mean, appear repeatedly in SE literature. For example, UNESCO (2017) suggests that “to create a more sustainable world ... individuals must become sustainability change-makers” (UNESCO, 2017, p. 7). This idea is expanded upon as follows:

ESD aims at developing competencies that empower individuals to reflect on their own actions, taking into account their current and future social, cultural, economic and environmental impacts, from a local and a global perspective. Individuals should also be empowered to act in complex situations in a sustainable manner, which may require them to strike out in new directions; and to participate in socio-political processes, moving their societies towards sustainable development. (UNESCO, 2017, p. 7)

According to UNESCO (2019a), Target 4.7 in SDG 4 Quality Education, aims to “empower learners to assume active, responsible and effective roles to tackle challenges at local, national and global levels” (UNESCO, 2019a, p. 2). These ideas connecting individual behaviours to large scale changes in society are further explicated in UNESCO 2020 Roadmap (UNESCO, 2020), where it delineates the role of education as a means “to bring about the fundamental behavioural shift to sustainable development” (p. 9).

The idea of big transformation implies changes in individual action intertwined with reorganization of societal structures, and it requires ESD to track the transformation... Fundamental changes required for a sustainable future start with individuals. ESD has to place emphasis on how each learner undertakes transformative actions for sustainability (UNESCO, 2020, p. 18).

According to this perception, education has a clear role of transforming individual behaviour, and the achievement of this goal needs to be monitored on an individual level. Thus, educational assessment must track each student’s behaviour, and measure the individual achievement of this educational outcome. This view concerning the role of education is referred to in the literature as *Individuation* approach (Olsson, 2021). In the context of this report the term *individuation messaging* is used to describe an educational approach that conveys the message to students that they bear personal responsibility to solving the CC problem through their individual daily behaviour.

The individuation messaging is at the heart of the ESD agenda. In its essence it represents a positivist, reductionist view that the whole is a linear sum of its parts, and

that if everyone behaves sustainably, the world will become sustainable, and the problem is solved. These ideas were profoundly criticised as discussed below.

Empirical Findings Concerning the Efficacy of Cultivating Behavioural Change at Schools

Studies examining the short- and long-term effects of sustainability education programs on students repeatedly reveal that the efforts to change students' behaviours were unsuccessful. A study examining 38 eco-schools in Flanders, compared to 21 control schools, revealed that in the eco-schools, students' knowledge increased. However, there was no effect on their behaviour (Boeve-de Pauw & Van Petegem, 2013). Similarly, large-scale research on the sustainable schools certification in Canada revealed no effect on students' environmental behaviour (Niebert, 2019). A longitudinal study reveals that students develop pro-environmental behaviours at ages 7-10, and that this effect drops in ages 14-18, regardless of increase in scientifically accurate knowledge (Otto et al., 2019). This suggests that even when educational efforts are successful in increasing intention to act, these effects wear off as children grow. This wearing off may potentially be attributed to increased knowledge about environmental issues, a relationship discussed further below.

One way for explaining the consistent lack of success in promoting individual behaviour, is by drawing upon Weckroth and Ala-Mantila's (2022) discussion regarding socio-spatial boundaries in determining behaviour. This perspective suggests that individual behaviours are never performed in an isolated manner, and they are always socio-spatially bounded. People naturally adopt to the socioecological systems in which they live, and these systems in turn pose constraints on behaviour. It follows, that when considering students' behaviour, there is a need to consider the socio-spatial context that operate beyond the schools and their influence. This means that when students live in an environment which is essentially consumerist in its overall behaviour, it inevitably limits their opportunities for pro-environmental behaviours to the extent that it sends a message that such behaviours are meaningless within their context. Thus, once again pointing to the importance of making changes at the system level, rather than the individual level.

Individuation *versus* Collective Action

The literature differentiates between *individual behaviour* and *collective action*.

Individual behaviour includes the range of behaviours that people can do in their private sphere, such as walk or cycle to work, rather than drive a car, or reduce households' consumption. *Collective action* refers primarily to participation in social movements related to CC, such as climate strikes (Jorgenson et al., 2019).

Unlike the individual behaviour, where people perform certain behaviours mostly related to reducing their consumption, or what is known as *carbon footprint*, in collective actions people come together to express their views and values and exert influence on decision makers that have the power to make changes at the system level. This difference is that while *individual behaviour* relates to the realm of behaviour acquisition, collective action relates to the realm of *attitude acquisition*. Thus, teaching for *behavioural change*, puts forward the expectation that students change their behaviour, whereas teaching for *collective action* puts forward the expectation that students express their attitudes and opinions in the public sphere. The literature does not seem to make this conceptual distinction and refers to both as *behaviour*. However, it does question the value of cultivating *individual behavioural change* as compared to cultivating *collective action*, where both are essentially perceived as different forms of behaviour.

Jorgenson et al. (2019) criticises the *individuation* approach and perceive it as a residue from the early EE approach in the 1970's. Furthermore, their review examined how this approach is expressed in educational interventions research. Table 1. adopted from Jorgenson et al. (2019) presents studies reporting on educational interventions concerning energy conservation and consumption. The review of the interventions clearly reveals that most educational programs focus on behavioural change at the private sphere.

Table 1

Recent EE Research that uses the energy behaviour of individual persons too measure the effectiveness of educational interventions

Table 3. Recent EE research that uses the energy behavior of individual persons to measure the effectiveness of educational interventions.

	Primary focus	Population	Energy behaviors measured	Type (Stern, 2000)
Dijkstra & Goedhart (2012)	Climate change education	Secondary school students	Energy conservation and consumption	Private sphere
Ojala (2012)	Climate change education	Young adults	Energy conservation	Private sphere
Lee, Lin, Guu, Chang, & Lai (2013)	Energy education	Elementary school students	Energy conservation	Private sphere
Clayton, Luebke, Saunders, Matiassek, & Grajal (2014)	Climate change education	Adults	Energy conservation and consumption	Private sphere
Walker & Redmond (2014)	Environmental education	Small business owners	Energy conservation and consumption	Private sphere
Carmi, Aron, & Orion (2015)	Environmental education	University students	Energy conservation	Private sphere
Barata, Castro, & Martins-Loução (2017)	Environmental education	University students	Energy conservation	Private sphere
Kil (2016)	Environmental education	Adults	Support for renewable energy subsidies	Policy support (Individual)
Yang, Lin, & Liu (2017)	Energy education	University students	Persuading people to conserve energy	Non-activist political (Individual)
Aguirre-Bielschowsky, Lawson, Stephenson, & Todd (2017)	Energy education	Elementary school students	Energy conservation and consumption	Private sphere
Stevenson, King, Selm, Peterson, & Monroe (2018)	Climate change education	Secondary school students	Support for adaptation and mitigation efforts Energy conservation	Policy support (Individual) Private sphere

Note. Reprinted from “Environmental education in transition: A critical review of recent research on climate change and energy education” by S. N. Jorgenson, J. C. Stephens, & B. White, 2019, *Journal of Environmental Education*, 50(3), 160–171.

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Jorgenson et al. (2019) note that in various studies *collective action*, rather than being perceived as a social collective action in pursuing shared interests, in fact it is simply conceived as the sum of individual actions, such as summation of the number of households that reduced their electricity consumption. Reimers (2021) criticised the educational focus on influencing individual behaviour, claiming that in effect this is a form of privatising climate action, and

reinforcing a simplistic and narrow conception of the relationship between climate change, human action, and energy system change and distorting the fact that many of the most impactful climate actions are decisions about energy supply systems that are made by state and market sector actors under direct pressure from advocacy coalitions and other social collectives (Reimers, 2021, p. 19).

Similarly, Kranz et al. (2022) stress that “greater effectiveness has been attributed to actions in the public sphere than to the actions of individuals” (p.1), where people are exerting pressure on governments to make system changes. However, they observe that in sustainability education, “the responsibility for the emissions is often attributed to large-scale societal actions, while mitigation actions focus on private and technical/scientific strategies and voluntary agreements” (Kranz et al., 2022, p. 20). This approach of delegating the responsibility for mitigation and adaptation to individuals received a range of criticism, related to supporting neo-liberalism, its strategic ineffectiveness, its underlying social engineering, and the negative emotional impact on students.

Criticising the Behavioural Change Approach

Individuation supports neo-liberalism

According to the neo-liberal view individuals are autonomous, free to choose a course of action, and thus assumed to be the primary agents of social change through their individual choices. It follows that the unsustainable state of the planet can be attributed to individual choices. Thus, the failure of students to make the correct choices regardless of the efforts of the education systems to encourage them do so, suggests that this must be each student’s individual failure (Olsson, 2021).

This neo-liberal worldview was criticised for serving the capitalist free market, as it privatises the need for climate action. By delegating the responsibility to individuals, educators may be inadvertently drawing attention away from where the problem essentially relies, thus enabling governments and industries to continue business as usual (Kenis and Mathijs, 2012; Ojala, 2015).

According to Kwauk (2020) the sustainability education agenda was “co-opted by neoliberal proclivities: Individual action and behavioural change prioritized over collective action and structural change” (p. 10).

As a result, education systems around the world continued to focus on preparing

children, youth, and adults “to join the local labour market to nourish the global marketplace and satisfy corporate needs” (Jickling & Wals, 2008, p. 2)—now under the guise of achieving sustainable development (Kwauk, 2020, p. 10).

Thus, the disproportionate responsibility that is placed on individuals may be regarded as a neoliberal tactic to evade governments and corporates’ responsibilities, by diverting the problem to the *down-stream* symptoms rather than the *upstream* causes (Bellino & Adams, 2017; Uzzell & Rätzzel, 2009).

The strategic ineffectiveness of *individuation*

Individual behavioural change is relatively insignificant in impacting CC. When 100 companies across the globe are responsible for 71% of global carbon emissions, what are the chances of any individual action to make a difference on CC matters? (McManus, 2022). An MIT class estimated the carbon emissions of Americans living in vastly diverse lifestyles, “from the homeless to multimillionaires, from Buddhist monks to soccer moms” (Massachusetts Institute of Technology, 2008, n.d.). The findings were clear. The lifestyle made no difference, they all produced more than twice as much greenhouse gas as the global average. They all lived beyond Earth carrying capacity for atmospheric carbon load (Massachusetts Institute of Technology, 2008). This is because the systems they relied on for sustenance continue to discharge carbon disregarding the differences in individual consumption and lifestyles. These findings clearly suggest that the problem is at the system level, and not a linear sum of the individual contributions.

Viewed from a system level perspective, CC is a typical case of the Tragedy of the Commons proposed by Hardin in 1968. The idea suggests that common resources such as air, water and soil are destined for depletion in the absence of regulation and enforcement. Thus far this idea continues to hold true for shared resources, where there are no direct interactions between the people sharing them, and there is no close physical proximity to the resources. Such is the case concerning resources affecting the climate. This hard-core fact was exemplified in Steinebach’s (2022) study. The study examined the air pollutant emissions of 14 OECD countries over a period of 25 years (1990 to 2014). The findings revealed that “only command-and-control (C&C) regulations that are put into practice through well-equipped and -designed implementation structures can be associated systematically with reductions in air pollutant emissions” (Steinebach, 2022, p. 255). All other approaches trialled, including softer approaches aiming to stimulate more environmentally friendly behaviour by “assisting

business and individuals by providing information on environmental issues” (p. 227), had no effect whatsoever.

The history of major social changes such as women's suffrage and illegalising slavery provide further evidence for the ineffectiveness of individual behavioral change. History reveals that big changes were led by mounting public pressure on government to change legislation. Thus, it was public expression of attitudes that drove the change, not individual behaviour (Eilam & Trop, 2012; Niebert, 2019). Niebert (2019) explicates that

it is not the individual abandonment of CFC-containing deodorants, not the individual change of your electricity provider from nuclear to green energy and not our individual decision to buy an electric car instead of a fossil car, that drives the world into a green state. It is hard political and economic decisions that make a difference (p. 3).

Corporates' engagement in social engineering

This apparent ineffectiveness of individual behaviours in impacting system change, begs the question of: How did it come to be that education systems are so preoccupied with individual *carbon footprint*? One possible explanation may have to do with purposefully designed *social engineering*. Here *social engineering* is defined as "any act that influences a person to take an action that may or may not be in their best interests" (Security Through Education, n.d).

Various publications point to a concerted effort since the late 1980's, by polluting companies to purposefully engage in social engineering by shifting public attention from the corporates' responsibilities to individual responsibility. One example is the establishment of the Global Climate Coalition (GCC) in 1989 in response to the establishment of IPCC in 1988, by the UN Resolution 42/187 (1987). The GCC was a consortium comprised of over 40 of the biggest and most polluting corporates in the United States. Equipped with a total estimated expenditure of \$8.3 million, the GCC's sole purpose was to manipulate the IPCC and undermine the climate change science. A review of the activities of this coalition revealed that

the GCC engaged in four distinct activities to obstruct climate action: 1) monitoring and contesting climate science, 2) commissioning and utilizing economic studies to amplify and legitimate their arguments, 3) shifting the cultural understanding of climate change through public relations campaigns and 4) conducting aggressive lobbying of political elites. Through these activities, the GCC played an important role in obstructing climate action, both in the U.S. and

internationally (Brulle, 2022, p. 1)

GCC was not alone in the corporate world, as soon after, it became standard practice for the fossil fuel industry and polluting companies to sponsor astroturfing organisations with misleading euphemistic names such as “National Wetlands Coalition”, “Greening Earth Society”, “Washington Consumers for Sound Fuel Policy” or “American Coalition for Clean Coal Energy” (Grolleau et al., 2022). Under the guise of grassroots environmental protection, these organisations were well positioned to convey misleading educational campaigns. Consequently, over the past four decades a sophisticated machinery of marketing companies and lobbyists, were established with the purpose of using whatever means available to create the social-political conditions that would allow them to continue *business as usual*. These strategies included among others, media campaigns for convincing the public that the responsibility for solving the problem lays in their hands, and if they change their individual lifestyle, the problems will be solved. In other words, rather than the corporates being accountable for their role in causing CC, it is the individual consumer that needs to be blamed and shamed.

According to a blog, in The University of Melbourne Scientific Scribbles (2021) one story describing the propagation of the *individuation* approach, goes as follows: In the early 2000 the oil company British Petroleum (BP) hired the public relations company Ogilvy & Mather to manage their public image. This company came up with the idea of diverting public attention from the company’s emissions (estimated at 340 million tonnes CO₂ equivalents per year in 2020 (Global Data, n.d.)), to individual households by promoting the concept of *carbon footprint*, and the idea that individual households are responsible for the carbon emissions. By 2004, 278,000 were already calculating their *carbon footprints*, and soon after whole school programs were planned around *carbon footprint* calculations.

Consequently, while researchers in the field of CC emphasise change at the political, economic and governance levels, sustainability educators and researchers continue to promote *individuation* regardless of its ineffectiveness (Jorgenson et al., 2019; Waldron et al., 2019). The stronghold of the *individuation* approach among sustainability educators may be viewed as a testimony for the success of the various social engineering campaigns. This can be exemplified in a European Commission report claiming that the aim of SE is to “empower individuals to reflect on their own actions, taking into account their current and future social, cultural, economic and environmental impacts from both a local and a global perspective” (Mulvik et al., 2022, p.13). Even more concerning is that ESD not only cultivates the

unsubstantiated idea that individuals can change the course of CC, but also participates in assisting corporates and governments with exporting the problem that has been created by the economic model, into the education system; giving the faulty message that while the economic model has created the problem, the education system will solve the problem. This idea is expressed as follows: “Formal education can play a particularly strong role in mitigating climate change, as well as responding to its impact” (Mulvik et al., 2022, p. 10). These ideas put students at risk of developing adverse mental health, as discussed in what follows.

The emotional impact of *individuation*

The *individuation* approach was criticised for repackaging the early 20'th century Behaviorism and bringing it back into schools. Once again we are seeing an educational approach which objectifies students through conditioning methods of rewards and punishment of behaviour, where students are praised for changing behaviour and let to feel guilty if they do not. Critiques of *individuation* claim that “in such approaches, people are considered as objects to be conditioned rather than that they are taken seriously as subjects of change” (Kenis & Mathijs, 2012, p. 53).

Various studies point to the negative psychological effects of the *individuation* approach. Kenis and Mathijs (2012) noted a sense of stress that may be interpreted as an outcome of guilt feelings that arise around the pressure to perform the so-called *responsible environmental behaviours*, as follows:

One respondent sent us two text messages after the interview, because she remembered a few of her individual actions that she forgot to mention during the interview. Only when we clearly stated that they could interpret engagement in a broad way, from reading about the environmental issue to signing petitions and so on, the respondents seemed to feel relieved, stopped focussing on their own individual behaviour change, and even started to severely criticise this strategy (Kenis & Mathijs, 2012, p. 55).

Hogg et al. (2021) developed and trailed a scale for measuring eco-anxiety. Their research revealed an important distinction between two types of anxiety. The first is anxiety directly related to the state of the environment, and the second is anxiety derived from one's concerns regarding their own impact on the environment. This finding has an important implication for education. It suggests that educational approaches that promote the message of individual

responsibility, are increasing the likelihood that students will develop anxiety concerning this issue. Furthermore, Hogg et al (2021) note that “rumination and personal impact concerns may persist to a greater extent over time as they are driven and maintained by cognitions (e.g., thoughts about the environment and one’s personal behaviours)” (p. 7). This suggests that inducing students to change their behaviour as means for solving CC, has both short term and long-term effect of causing anxiety.

How does Increased Climate Change Knowledge Relate to Behavioural and Attitudinal-Emotional Changes?

The SE literature suggests that increased knowledge concerning CC may be associated with increased intention to change behaviour (UNESCO, 2021a,b). It is also assumed that by promoting individual behavioural change in everyday context, students will be empowered to become change agents, “increase their understanding and engagement, and avoid the despondency and helplessness that climate change can foster” (Jorgenson et al., 2019, p. 165). The evidence does not support these assertions, in fact it points to the opposite. In what follows, the relationships between increased knowledge and behaviour are discussed, followed by examination of the relationships between increased knowledge and other emotional and attitudinal aptitudes.

The relationship between knowledge and individual behaviour

Research examining the relationships between increased CC knowledge and increased performance of pro-environmental behaviours reveal that the correlations range between negative to weak correlations (Busch et al., 2019; Kranz et al., 2022). The evidence for these relationships come from multiple studies examining multiple aspects of the relationships between CC knowledge and individual behaviour.

A study by Kenis and Mathijs (2012) among 12 environmental activists, found that common to all of them was a sense of powerlessness in the face of CC, and lack of belief in individual action, as means for addressing CC. These environmentally informed people stated that “they used to be very strict on their individual behaviour in the past but became less rigid in this because of their doubts about the usefulness of this type of action” (p. 52). This suggests that people who are at the frontline of working on CC issues have less faith in the usefulness of individual actions to impact the course of CC.

Similarly, the OECD’s 2018 Programme for International Student Assessment (PISA)

showed that while 79% of 15-year-olds students knew about CC, only 57% of the students felt that they could do something about CC (OECD, 2018). Similar to the above findings among adult environmental activists, the PISA results showed that among youth, increased knowledge about CC is associated with a sense of powerlessness, and less faith in the power of individual behaviours to make a difference (European Commission, 2022; Schleicher, 2021).

Powdthavee (2020) examined the relationships between raising of the minimum school leaving age from 15 to 16 years of age, and the acquisition of pro-environmental behaviour among 20,000 England-born citizens. The findings revealed that increased level of understanding of the causes of CC did not result in increased intention to behave in pro-environmental behaviours. Furthermore, more education was correlated with more belief that the environmental crisis is beyond control. Powdthavee (2020) concluded that "although more education had managed to have a desirable impact on the participants' understanding about the causes of climate change, it did not effectively increase their willingness to change their behaviours to help save the environment" (p.13).

A UNESCO (2021b) study among teachers found that while 40% of teachers reported confidence in teaching CC knowledge, only 20% were able to explain how to reduce their carbon footprint. Thus, once again pointing to the low association between CC knowledge and individual behavioural change. Similar results were obtained in a study examining the impact of an educational intervention among 628 Australian adults. The intervention consisted of increasing the participants' knowledge concerning the negative impacts of the palm oil industry on the environment, and the importance of purchasing sustainable palm oil, as well as providing information regarding various behaviours that individuals can perform to help promote the use of sustainable palm oil (Sundaraja et al., 2022). The findings revealed that while the participants' knowledge and awareness about the issue significantly increased, this had no effect on the participants' consumer behaviour, and could have even had potentially negative effect. Contrarily, the control group who received no knowledge and training concerning sustainable palm oil, showed more pro-environmental consumer behaviour in relation to palm oil. The authors suggested that the increased understanding of the complexity of the issue, may have acted to inhibit pro-environmental consumerism (Sundaraja et al., 2022).

Finally, some reports suggest that people involved in environmental activism, tend to have lower scientific knowledge about the issues (Rousell & Cutter-Mackenzie-Knowles, 2020).

This was demonstrated in Kranz et al.'s (2022) study that found negative correlation between environmental understanding and performance of pro-environmental behaviours. Participants who had higher environmental understanding had a higher carbon footprint than those who were less aware. Furthermore, the study revealed that the best predictor of low consumption is people's income, not their environmental awareness.

One possible explanation for the findings that people who understand more act less, and people who understand less act more, is that the growing understanding of the CC problem brings about more accurate appraisal of the situation, and a more realistic assessment of people's individual abilities to make a difference. This leads to the sensible conclusion that individual behaviour will not make a difference in the big scheme of CC. Thus, the findings once again demonstrate that increasing CC knowledge while advocating for individual reduction of resource consumption, as means for solving CC, is ineffective and counterproductive.

The relationships between climate change knowledge and attitudinal-emotional aptitudes

As discussed above, the *individuation* approach has direct negative effects on people's state of mind. However increased CC knowledge seems to also play a role in impacting states of mind, both directly, and in interaction with *individuation*. Studies found associations between increased CC knowledge and reduced states of mind. These states of mind include pessimism, helplessness /powerlessness, apathy, and in some cases also anxiety and depression. Contrarily, reduced CC knowledge is associated with CC denial, scepticism, or naïve optimism.

The 2018 PISA results revealed not only that increased knowledge of CC is associated with less intention to act, but also that the increased knowledge may also be associated with increased pessimism, which in turn may lead to a sense of helplessness (Jensen, 2002, Kenis & Mathijs, 2012).

Clayton (2020) proposed a psychological explanation for the interactions between the three factors: increased CC knowledge, exertion of pressure on students to solve the problem through individual behaviour, and a sense of helplessness. Her explanation suggests a psychological coping mechanism by which when students appraise the problem as not being amenable to solution, yet at the same time they are encouraged to solve the problem through individual behaviour, this may lead to distress, which in turn may lead to a range of

responses, including pessimism, depression, anxiety or apathy. Viewed from a different angle, it seems that increased CC anxiety does not lead to more intention to act, but rather to forming barriers and dissociation from CC (Robison et al., 2022).

At the other end of the spectrum is the lack of CC knowledge. Less CC knowledge seems to be associated with scepticism, CC denial, and naïve optimism. In scepticism and denial there is disbelief in the extent of the problem (Busch et al., 2019; Stevenson et al., 2020). In naïve optimism, there is an assumption that the problem is solvable, and that it is likely to be solved (Schleicher, 2021). The literature associate scepticism and denial with low engagement with environmental behaviours, whereas naïve optimism is associated with high engagement in environmental behaviour (Ojala, 2013).

The notion of hope was also addressed in the literature in relation to behaviour. Armstrong & Krasny (2020) suggest that engagement with pro-environmental behaviours is associated with hopefulness about combating CC. Ojala (2013) added the notion of *constructive hope* to signify effective coping mechanisms versus ineffective. It thus appears that hope may be regarded as equivalent to naïve optimism and can be associated with low CC knowledge on one hand and increased willingness to perform environmental behaviour on the other hand.

Clusters of Relationships

Taken together, the review of the literature suggests that there may be four clusters representing associations of relationships between CC knowledge, behavioural change and mind-sets, in the context of CC educational programs. These are presented in Table 4.6.1. The four clusters describe different combinations of level of CC knowledge provided by educational programs, level of *individuation* messaging, and students' responses in relation to behavioural change and development of mind-sets related to CC. It is important to note here that to the extent of knowledge no research was carried out to examine and validate these associations. These associations are offered here as a hypothesis requiring further research. Some of the associations have more direct evidence-based support, and some are merely referential, with no direct supporting evidence.

Cluster 1 describes the association between: high CC knowledge, high *individuation* messaging, low behavioural change response and development of mindsets that may consist of pessimism, helplessness/powerlessness, apathy, anxiety, or depression. The evidence for this association is derived from the work of: Boeve-de Pauw and Van Petegem (2013); Hickman et al, 2021; Otto et al. (2019); Niebert (2019); Sundaraja et al., 2022; and others.

These scholars provided empirical evidence for the negative relationships between increased CC knowledge, *individuation* messaging and low behavioural change response. Hogg et al. (2021); and Kenis and Mathijs (2012) provide empirical evidence for the negative emotional impacts associated with this cluster. Particularly a strong association was found between increased CC knowledge and development of CC anxiety (Clayton & Karazsia, 2020; DeWaters, et al., 2014; Flanagan, 2022; Searle & Gow, 2010). Overall, the associations presented in this cluster are supported by some empirical evidence.

Cluster 2 describes the association between: high CC knowledge, low *individuation* messaging, low behavioural change response and personal growth. The evidence-basis for this association is the weakest, however, the theoretical basis seems convincing. The two main scholars contributing to this association are Young (2013) and Biesta (2020). Young's contribution is in relation to the acquisition of knowledge, whereas Biesta's contribution is in relation to minimising *individuation* messaging, where students are prescribed what they should become. Young (2013) introduced the notion of *powerful knowledge*, suggesting that quality education equips students with knowledge that prepares students for successful participation in adult life. This is "important knowledge that pupils should be able to acquire at school" (Young, 2013, p. 103). According to Young the powerfulness of the knowledge is intrinsic. It holds current best understanding of claims of truth and its value for students is in supporting their personal growth. This view contrasts the neo-liberal view by which the worth of knowledge is measured by its ability to serve the economy, thus its purpose is ulterior with no intrinsic value on its own. Biesta (2022) criticised learning outcomes based on behaviour modification. The *individuation* messaging stands in contrast to Biesta's claim that "... instead of asking what the schools should "do" for society—which seems to have become the most prominent way in which the task of the school is nowadays being conceived—I ask what society should "do" for the school so that the school can be a school" (Biesta (2022p. 9). Taken together, the removal of *individuation* messaging and the focus on knowledge acquisition holds the potential to provide students with what Young (2013) termed "*powerful knowledge*" (Young, 2023, p. 108) and Biesta termed "world-centred education" (Biesta, 2022, p.90). Common to both perspectives is the recognition of the intrinsic value of education, being unrelated to predetermined utilitarian and behavioural outcomes. Ultimately supporting students' existence "in and with the world" (Biesta, 2022, p. 3).

Cluster 3 describes the association between: low CC knowledge, high *individuation* messaging, high behavioural change response, and development of naïve optimism and hope.

This cluster is supported by evidence suggesting that when the educational program focuses primarily on *individuation* messaging, with limited provision of CC knowledge, students may respond in changing their behaviour while developing naïve optimism that the problem would be resolved (Schleicher, 2021). Evidence supporting this association are derived from Ojala’s (2012, 2013) work around coping strategies and the role of hope in CC education.

Additionally, Sundaraja et al.’s (2022) findings suggest an association between low level of knowledge and more pro-environmental behaviour.

Finally, Cluster 4 describes the association between: low CC knowledge, low *individuation* messaging, low behavioural change response, and development of denial or scepticism. Here too, evidence for this association is derived from Ojala’s (2012, 2013) studies, suggesting that scepticism and denial act as emotional coping mechanisms, where some students de-emphasise the threat by claiming that it is exaggerated or denying its threatening potential all together (Ojala, 2013, 2018). Some studies suggest that low level of CC knowledge together with denial and scepticism responses, increase people’s vulnerability to media influence and false messaging (Bentley et al., 2016). Table 2 presents a summary of the four clusters.

Table 2

Clusters of associations between School CC educational approach and potential educational outcomes, by level of CC knowledge taught, level of individuation messaging, students’ responses in relation to changed behaviour and potential mind-states

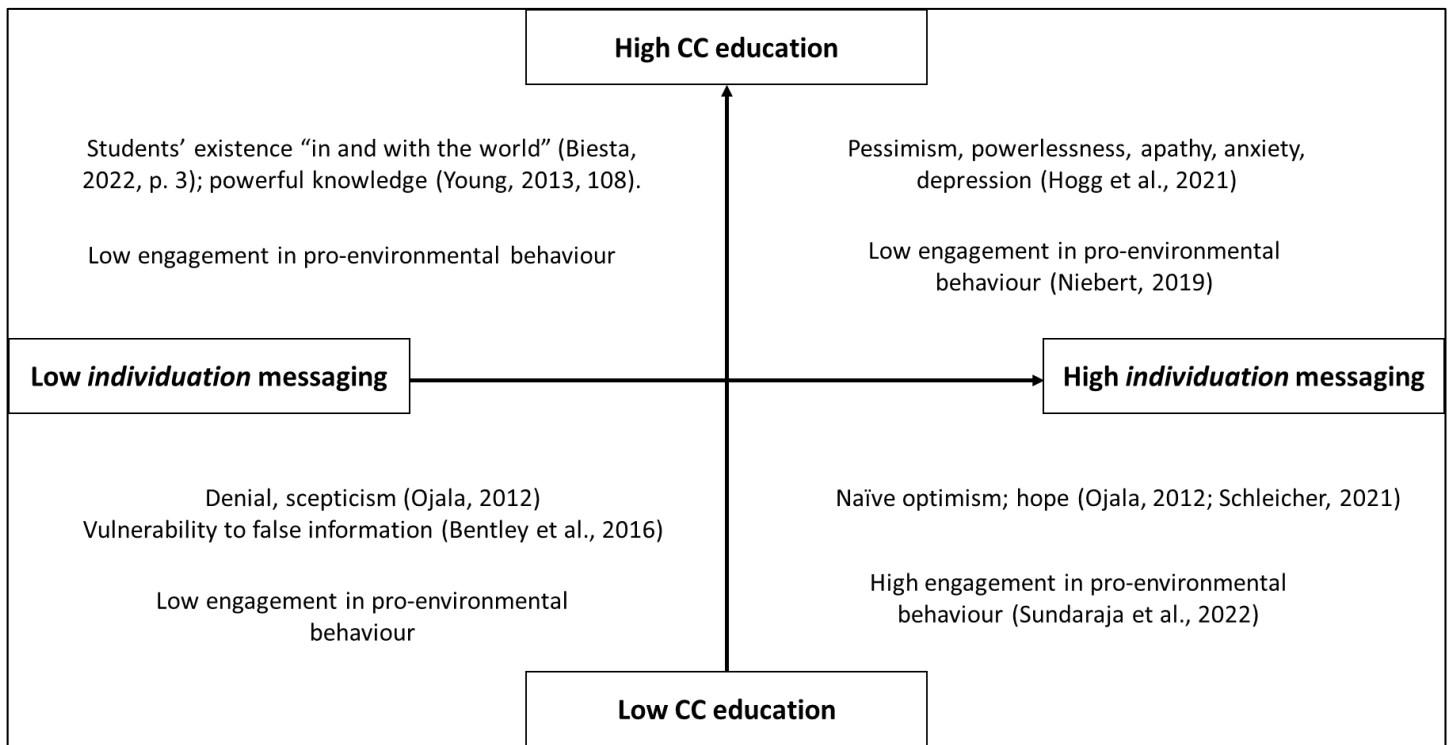
Cluster No	School educational approach		Educational outcomes	
	CC Knowledge	Individuation messaging	Behavioural change	Mind-States
1	High	high	Low response	Pessimism, helplessness/powerlessness, apathy, anxiety, depression
2	High	Low	Low response	Existence “in and with the world” (Biesta, 2022, p. 3)
3	Low	High	High response	Naïve optimism, hope
4	Low	Low	Low response	Denial, scepticism

Another way for portraying these associations, is by considering school educational input as varying along two intersecting continuums, where one continuum describes the level of CC knowledge taught from low to high, and the intersecting continuum describes the level of

individuation messaging from low to high. The four spheres between the intersecting continuums describe different educational conditions, each producing different emergent educational outcomes. These configurations are presented in Figure 1.

Figure 1.

Four clusters of knowledge-behaviour-state-of-mind associations, by level of CC knowledge and Individuation messaging input, and student behavioural and state-of-mind outcomes



Overall, there seems to be strong indication that encouraging students to perform individual behavioural changes for the purpose of solving CC is misleading, ineffective and psychologically damaging. However, there is some indication that when students come together to express their attitudes, in what is known as *collective action*, this may not be the case. A growing body of literature suggests that collective action may even protect against anxiety and depression (Schwartz et al., 2022).

Conclusions: Reframing the Role of Behaviour in Climate Change Education

If the role of behaviour is not to solve the CC problem, then does behaviour have any role at

all to play in CC education? Another way of asking this question, is as follows: Why teach behaviours such as refraining from using disposable products or walking to school instead of being driven, if it makes no difference whatsoever in relation to the state of CC?

The proposed answer to this question is: Because these are the right thing to do. These norms of behaviour reflect the values that we as society wish to instil in our children. Stemming from a universal ethics perspective, our role as educators is to teach our students the set of values and ethical behaviours that need to regulate and underlie the relationships between humans and Earth.

The reason for teaching environmental behaviour at schools should not be different than the reasons for teaching students not to bully each other at the playground. We teach not to bully, not because we wish students to go out into the world and solve countries' territorial conflicts with each other, such as governments' bullying behaviours toward neighbouring countries. We do so, because we wish to educate humans that are capable of respectful and ethical conduct among each other, and in their communities. Similarly, we teach students not to bully the Earth by unnecessary consumption, not because we wish them to solve CC, they can't, and it is inappropriate to expect them to do so. We do so because we wish to raise human beings who are respectful of the Earth and express their appreciation for Earth's limited resources by not trashing it, and through other forms of respectful behaviour.

Viewed from this perspective, behaviour plays a critical role in ethics education. It is the normative-behavioural expression of the values and ethics that need to govern societies' conduct and students included. It is not a means for solving the CC problem. The CC problem was not created by the education system, and it will not be solved by the education system. Yet regardless, education has a critical role in preparing students for living in CC and in cultivating the ethics and norms of behaviours that need to guide them through life.

The difference between the two views concerning the role of behaviour is fundamental, where according to one view behaviour plays an instrumental role and according to the other view it forms an educational end goal. The instrumental view of education, by which behavioural acquisition serves ulterior purposes reflects a neo-liberal worldview. According to this view, all things are judged by their instrumental value. Ethics is perceived as relativist, pluralist, unbounded by ethical universalism. Thus, students are

led to judge the worth of their individual behaviours by the extent to which their behaviour helped solve the CC problem. However, when behaviour is framed within ethics education, the education itself becomes the goal. Here the focus shifts from solving the CC problem to focusing on educating the students and preparing them to living in a CC era. This perception aligns well with Biesta's conceptualisation of the three schooling domains of purposes, which include: qualification, socialization, and subjectification. Where qualification refers to schools' role in transmission of knowledge and skills. Socialisation refers to the representation of cultures traditions and practices, including cultural norms and values. And subjectification refers to the growth of students as individuals, the opportunities and restrictions provided to them to realise their potentials. Essentially it relates to "how I exist as the subject of my own life, not as the object of what other people want from me" (Biesta, 2020, p. 93). The elimination of *individuation* in SE and CC education enables to refocus education on these three domains of purposes, where behaviour plays a role in educating the student across the three domains.

The dissociation of behaviour from its instrumental goal, eliminates many of the negative impacts of *individuation*, outlined above. For example, students will be freed of guilt feelings and anxiousness associated with their behavioural impact on CC. Furthermore, once behaviours are dissociated from saving the planet, students may be more inclined to perform environmental behaviours, as they do so because it is the right thing to do, not as means to solve CC. It also follows that the association between increased CC knowledge and decreased behaviour will break down. This is because when behaviour is framed as a normative ethical act, it is not aimed to solve CC in the first place, thus the intrinsic value of the behaviour continues to hold, irrespective of increased knowledge regarding the uselessness of the behaviour in solving the problem. This was expressed well by environmental activists in Kenis and Mathijs's (2012) study, where "almost none of the respondents said they believe that individual behaviour change could make a real contribution to tackle climate change. The arguments given for this kind of engagement were all of an ethical nature, they were about 'doing the right thing'" (p. 51). Indeed, environmental behaviour is no more and no less than doing the right thing. Furthermore, Neibert (2019) suggests that if we relieve teachers from the need to promote individual behavioural change that doesn't work anyways, they will be free to focus on providing in-depth CC education that

addresses the real underlying systemic issues.

To conclude, behaviour has and always had an important role to play in educating young people. However, in recent years it appears that the SE agenda has hijacked behaviour and reframed its role in the service of ulterior purposes. The present paper presented strong evidence for the ineffectiveness of this approach, its moral lacking, and its potential harm to student well-being. By reinstating the role of behaviour as having an intrinsic value within ethics education, behaviour could once again play its valuable role in the complex undertaking of educating a person to live as well as they can within a society.

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Competing interests

The author(s) declare no competing interests.

Data sharing

Data sharing is not applicable to this article as no datasets were generated or analysed during the current study.

Ethical statement

This article does not contain any studies with human participants performed by any of the authors.