BEYOND THE SHADOWS OF THE DIGITAL CAVE: EDUCATIONAL CARE AND SELF-REGULATION IN THE HYPER-CONNECTED ADOLESCENT

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ABSTRACT
This paper investigates the relationships between binge-watching (BW), executive functions (EF) and dispositional mindfulness in a sample of 212 adolescents from the province of Taranto (aged 14–20), based on an observational-correlational study that utilised the WTSMQ, the BWESQ, the TEXI and the FFMQ. The results show robust and significant correlations between executive difficulties and problematic engagement in BW (total TEXI–total BWESQ: $r = .708$, $p < .001$), as well as a mediation model in which mindfulness is associated with lower executive difficulties ($b = −0.3173$, $p < .001$), which in turn are associated with higher levels of problematic BW ($b = 1.5335$, $p < .001$), with a significant indirect effect and no significant direct effect. A robustness analysis using the 'Acting with Awareness' subscale ($\alpha = .859$) replicates this mediation pattern. This paper reinterprets these data within an integrated pedagogical framework, proposing educational care – in its relational, institutional and political dimensions – as a structural response to adolescent media dysregulation.

KEYWORDS
Binge watching; executive functions; mindfulness; self-regulation; educational care.

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1. Introduction

The proliferation of video-on-demand platforms and the algorithmic structure of streaming services have radically transformed audiovisual consumption practices, generating what Granow et al. (2018) describe as longer, more intense and more self-determined consumption compared to traditional television. Binge watching (BW) – the continuous, serial viewing of multiple episodes in prolonged sessions – is no longer a niche behaviour, but a ubiquitous practice involving growing segments of the world's youth population, with significant peaks among adolescents and young adults (Flayelle et al., 2020; Alimoradi et al., 2022). While the phenomenon has attracted growing attention from the international scientific community since 2013 – the year in which Oxford Dictionaries included it among its 'Words of the Year' and Netflix simultaneously released the entire first season of House of Cards – its pedagogical significance remains insufficiently explored in relation to the available psychological and communication research.

This research is driven by a twofold realisation. On the one hand, BW does not lend itself to a one-dimensional interpretation: the existing literature reveals the absence of a single, unambiguous operational definition and the coexistence of a multitude of approaches, ranging from definitions based on the number of episodes (from 2 to 'an entire season') to those based on the intensity, consecutiveness and intentionality of the behaviour (Flayelle et al., 2020; Starosta et al., 2021; Billaux et al., 2022). On the other hand, the pedagogically essential question concerns not so much the quantitative threshold of BW as its function: why do some adolescents engage in it with traits of automatism, procrastination, sleep deprivation and relational isolation, while others engage in it in an intentional and reflective manner?

It is on the basis of this question that this paper adopts the metaphor of the 'digital cave' as its central interpretative framework. Plato's allegory – the prisoners in the cave who mistake the shadows cast on the wall for reality, unable to turn towards the light because their bodies are chained in immobility – offers a useful interpretative image for understanding the condition of the hyperconnected adolescent, not in moralistic or apocalyptic terms, but as a structural diagnosis of a certain relationship with media experience. The continuous, algorithmically

personalised flow of serialised narratives blurs the perception of time, reduces the critical distance between the viewer and the narrative, and can function as a compensatory response to emptiness, boredom, anxiety or identity fatigue (Flayelle et al., 2020). Like Plato's prisoners, the adolescent inhabiting the digital cave is not necessarily aware of their bondage: the shadows appear real, sufficient and gratifying. The pedagogical challenge – like the exit from the cave in the myth – does not lie in removing the shadows, but in creating the conditions for the individual to turn round, recognise them for what they are, and deliberately choose how to engage with them. The response to this challenge calls upon the cognitive mechanisms of self-regulation and the quality of educational support that the school environment is able to provide.

2. THEORETICAL FRAMEWORK

2.1. Binge-watching as an ambivalent media practice

In today's advanced digital age, BW emerges as an intrinsically ambivalent media practice, situated at the intersection of media ecology, identity construction, emotional regulation and the management of subjective time. Its nature cannot be reduced to the logic of behavioural addiction – as, indeed, the more cautious strand of research argues (Flayelle et al., 2020; Conlin et al., 2016) – nor to a mere quantitative excess of audiovisual consumption. The study by Flayelle et al. (2019), among the most methodologically rigorous of the last decade, distinguishes four clusters of viewers — recreational, regulated, avid and unregulated binge-watchers — ranging from occasional or intentionally moderated viewing to more impulsive and coping-oriented patterns. This empirically grounded taxonomy, developed and validated through the WTSMQ and BWESQ scales in a large online survey (N = 6,556), allows us to move away from the dichotomous normality/addiction framework in favour of a continuum ranging from non-problematic intensive engagement to forms of dysfunctional coping and emotional dysregulation (Billaux et al., 2022; Flayelle et al., 2019).

It is in this transition – from consumption as a recreational choice to consumption as an automatic compensatory response – that the hermeneutic significance of the 'digital cave' lies. The ubiquitous availability of on-demand content, the automatic nature of autoplay and the algorithmic personalisation of content create a symbolic environment in which adolescents do not merely consume narratives, but inhabit forms of immersive and potentially all-encompassing experience: an environment structurally designed to lower the threshold for voluntary interruption and

maximise dwell time. This is not a matter of demonising streaming platforms, but of recognising that the technological architecture may increase demands on adolescents' executive control, amplifying the difficulty of intentionally interrupting, deferring and reorienting their actions precisely at the developmental stage when these abilities are still being consolidated.

The multidimensional nature of the phenomenon is confirmed by the variety of factors that the literature has identified as antecedents and consequences of BW. With regard to antecedents, research consistently highlights the role of emotional dysregulation (Starosta et al., 2021; Favieri et al., 2023; Spataro et al., 2024), impulsivity (Flayelle, Verbruggen et al., 2020; Steins-Loeber et al., 2020) and low stress tolerance (Pittman & Steiner, 2019; Tóth-Király et al., 2017). In terms of effects, the evidence shows associations with depressive and anxiety symptoms (Ahmed, 2017; Flayelle et al., 2020; Yu & Alizadeh, 2024), disturbances in the sleep–wake cycle (Exelmans & Van den Bulck, 2017; Forte et al., 2023), a sedentary lifestyle and a decline in academic performance, but also – on the positive side – narrative immersion, cognitive engagement, social connection and hedonic gratification (Merikivi et al., 2018; Granow et al., 2018; Rubenking & Bracken, 2021). The pedagogically relevant issue is therefore not the presence of BW, but its function within the adolescent's psychological economy: to the extent that serial viewing becomes a compensatory response to emptiness, boredom, anxiety or identity-related fatigue – which the metaphor of the 'digital cave' seeks to figuratively evoke – it marks the transition from cultural experience to an avoidance strategy.

The motivations for binge-watching, systematically investigated using the WTSMQ (Flayelle, Canale, Vögele, Karila, Maurage, & Billieux, 2019), articulate this distinction empirically: coping/escapism (seeking refuge in TV series from negative emotions and the difficulties of real life), enrichment (developing intellectual experiences and knowledge), emotional enhancement (experiencing intense emotional states) and socialisation (building interpersonal connections through shared narratives) are not equivalent motivations in terms of the risk of problematic BW. The finding that the strongest associations with executive difficulties relate precisely to coping/escapism – as the results will show – is consistent with the hypothesis that problematic BW is more frequently situated on the side of compensatory regulation than on that of enrichment.

Table 1: Taxonomy of BW: from non-problematic engagement to dysregulation

Dimension	*Non-problematic BW*	*Problematic BW*
Intentionality	Conscious and planned choice	Automatic and non-deliberate engagement
Control	Voluntary interruption maintained	Persistent difficulty in stopping
Function	Relaxation, enrichment, narrative socialisation	Dysfunctional coping, escape, substitute emotional regulation
Impact	Neutral or positive on daily activities	Procrastination, sleep deprivation, social isolation
Predominant motivation (WTSMQ)	Enrichment, Emotional Enhancement, Social	Coping/Escapism
Measurement tool	BWESQ positive subscales (Engagement, Pleasure Preservation)	BWESQ problematic subscales (Dependency, Loss of Control)

The theoretical link that connects BW and the pedagogy of care is therefore self-regulation. Executive functions underpin the intentional control of action, enabling individuals to maintain goals, interrupt automatic responses and delay immediate gratification (Best & Miller, 2010; Lezak, 1982). During adolescence, the fact that these functions are not yet fully consolidated makes the interaction with media practices that demand continuity, immersion and immediate response particularly significant. Within this framework, dispositional mindfulness can be understood as a metacognitive skill that supports self-regulation (Baer et al., 2006; Zimmerman, 2000). As the FFMQ is a multidimensional instrument, the *Acting with Awareness* subscale takes on particular importance in the present study, as it is theoretically consistent with the transition from automatic to mindful engagement.

2.2. Educational care as a pedagogical response to digital dysregulation

The question raised by the data is not exclusively clinical, but also pedagogical: if the executive difficulties associated with problematic BW are an expression of a developmental phase still in the process of consolidation, and if mindfulness operates via the executive system rather than directly on serial use, then the school's task is neither to penalise BW nor to assume that it can reduce it through blanket bans, but to work on the cognitive, relational and institutional conditions that make self-regulation possible. It is here that the concept of educational care –

in the sense elaborated by Mortari (2006), Noddings (1984) and Tronto (1993) along converging but not overlapping trajectories – takes on hermeneutic and planning significance.

Mortari (2006) understands care as an intentional practice that does not involve doing things on behalf of the other, but rather creating the conditions for the other to progressively learn to care for themselves, the world and others. In this sense, educational care for the hyperconnected adolescent does not mean restricting access to streaming platforms, but rather creating spaces for experience in which the individual can articulate the need underpinning their compulsive use, examine their own media habits, and explore alternatives for gratification, relationship-building and planning. According to Noddings (1984), the educational relationship becomes a space of asymmetrical responsiveness: not surveillance or judgement, but listening that recognises the other in their uniqueness and developmental vulnerability, and which, in this way, promotes their agency. This relational dimension of care cannot be reduced to the individual disposition of a particularly empathetic teacher: it is a practice that requires pedagogical intent, specific training and, above all, a school organisation that supports it.

The institutional dimension of care emerges strongly when one considers the structure of the digital environments in which adolescents spend most of their time outside school. The automatic playback of episodes, the algorithmic personalisation of content and the absence of advertising breaks are not neutral features: they are technological tools designed to reduce the perception of time, lower the threshold for voluntary interruption and maximise the time spent on the platform (Martínez-Hernández & Lloret-Irles, 2024). Faced with these environments, schools are called upon to exercise a responsibility that extends beyond the interpersonal level to have organisational and political significance: to create educational counter-environments in which it is possible to learn to pause,

set limits, make reflective choices and be present (Tronto, 1993). Tronto's concept of 'caring about', which precedes and underpins 'taking care of', implies that the school community should be concerned with pupils' digital wellbeing not as an emergency response but as a structural component of the educational programme.

This organisational responsibility translates into concrete interventions that the most recent literature has begun to evaluate empirically. Martínez-Hernández and Lloret-Irles (2024), in a systematic review of school-based interventions show that the most effective strategies are not based on blanket bans but on strengthening self-control, critical awareness, time management and decision-making skills: precisely the dimensions that the mediation model of this research identifies as a critical link between mindfulness and problematic BW. Translating these findings into a school curriculum implies that digital media education should not be confined to individual teaching units, but should permeate the daily life of the classroom: in time-management practices, in metacognitive reflection on one's own emotional states, in the collective construction of shared rules, and in the recognition of the needs that fuel automatic behaviours. From this perspective, educating about BW means educating about temporality, thresholds, interruption and responsibility; emerging from the 'digital cave' does not mean abandoning screens, but rather acquiring a perspective capable of recognising shadows, interpreting them and incorporating them into the formation of the self (Platone, *Republic*, Book VII).

2.3. Objectives and research questions

Accordingly, the study examines the associations between problematic BW, executive difficulties and dispositional mindfulness in upper secondary school adolescents through four research questions:

- **RQ1:** What relationships exist between executive function difficulties and problematic involvement in BW?

- **RQ2:** Which motivations for serial viewing are most strongly associated with executive difficulties?
- **RQ3:** Does executive functioning mediate the relationship between dispositional mindfulness and problematic BW?
- **RQ4:** Do gender, type of institution and regular use of streaming platforms help to explain differences in levels of problematic BW?

Consistent with self-regulation literature, we hypothesised that: H1, greater executive difficulties would be associated with higher problematic BW; H2, coping/escapism would show the strongest associations with executive difficulties; H3, executive functioning would mediate the relationship between mindfulness and problematic BW.

3. METHODOLOGY

3.1. Design and participants

This observational-correlational study, incorporating mediation analysis, involved upper secondary school pupils from Puglia (Italy). The protocol was administered via an anonymous online questionnaire from May 2024 onwards, with the informed consent of students of legal age and of parents for minors, in full compliance with current regulations on the protection of personal data (GDPR 2016/679). The informed consent form specified: the purpose of the research, the absence of direct risks, the instruments used (WTSMQ, BWESQ, TEXI and FFMQ), the estimated duration of approximately ten minutes, anonymity, the fact that no names or email addresses would be collected, the processing of data in aggregated form, and approval by the Ethics Committee. Following the data cleaning procedure – aimed at excluding records with straight-lining responses (identical response options across all items of a scale) and other incoherent patterns – the final dataset included 212 valid cases out of 221 (95.9%).

The sample was predominantly male (65.1%, n = 138; females 34.0%, n = 72; two participants did not report their gender), aged between 14 and 20 (most represented age groups: 14 years 27.8%, 15 years 23.1%), distributed across technical colleges (50.9%, n = 108), vocational schools (34.0%, n = 72) and Italian lyceums (15.1%, n = 32). The most common educational attainment among parents was lower secondary school certificate (fathers 44.2%; mothers 45.7%), followed by upper secondary school diploma (30.3% for both) and a university degree (16.8% of fathers; 18.8% for mothers). The schools involved were the I.T.T. 'A. Pacinotti' in Taranto, the I.S.S.S. 'Archimede' in Taranto and the 'G. Moscati' State Grammar School in Grottaglie (TA). 80.2% reported using streaming platforms regularly.

Given that the TEXI is validated for adolescents aged 13–19 (Thorell et al., 2020), the inclusion of a small number of 20-year-old participants was considered acceptable in light of their minimal deviation from the target age range and the exploratory nature of the study. Nonetheless, the presence of these older participants should be borne in mind when interpreting the results.

3.2. Instruments

The WTSMQ (Watching TV Series Motives Questionnaire) assesses motives for watching TV series through 22 items on a 4-point Likert scale, organised into four subscales: Social, Emotional Enhancement, Enrichment and Coping/Escapism (Flayelle, Canale, Vögele, Karila, Maurage, & Billieux, 2019).

The BWESQ (Binge-Watching Engagement and Symptoms Questionnaire) measures engagement in BW through 40 items on a 4-point Likert scale, organised into seven subscales: Binge-watching, Desire/Savouring, Engagement, Positive Emotions, Pleasure Preservation, Dependency and Loss of Control (Flayelle, Canale, Vögele, Karila, Maurage, & Billieux, 2019). The instrument allows for the distinction

between high but non-problematic engagement and dysfunctional forms of serial viewing.

The TEXI (Teenage Executive Functioning Inventory) assesses everyday executive functioning in adolescents using 10 items on a 4-point Likert scale, across two subscales: Working Memory and Inhibition (Thorell, Lazarević, Milovanović, & Ignjatović, 2020). In the present study, an Italian translation/adaptation of the TEXI was administered, based on the original instrument; higher scores indicate greater self-reported executive difficulties.

The FFMQ (Five Facet Mindfulness Questionnaire) measures dispositional mindfulness through 39 items on a 5-point Likert scale, organised into five subscales: Observe, Describe, Act with Awareness, Non-judge and Non-react (Baer et al., 2006). In the present sample, the total score showed low internal consistency (α = .516), confirming what has been reported in the literature regarding the structural heterogeneity of the instrument in adolescent populations. This psychometric limitation does not undermine the validity of the individual subscales, when assessed separately: the Acting with Awareness subscale showed high internal consistency (α = .859) and is theoretically consistent with the construct of automatic engagement and non-deliberate action, thus constituting the preferred predictor in the robustness/sensitivity analysis (§4.5).

3.3. Data analysis

The data were analysed using IBM SPSS Statistics v.28 and Hayes's (2022) PROCESS macro. The analyses included: descriptive statistics, Cronbach's α, Pearson's correlations, t-tests, one-way ANOVA with Tukey's post hoc test, multiple linear regression and simple mediation models (PROCESS Model 4) with percentile bootstrapping using 5,000 resamples. The mediation models were interpreted with caution, given the cross-sectional nature of the design: the terms 'predictor' and

'mediation' indicate statistical relationships consistent with the theoretical model, not causal evidence in the strict sense. The significance of the indirect effect was assessed using a 95% confidence interval (CI): the absence of zero within the CI indicates statistically significant mediation (Hayes, 2022).

4. RESULTS

4.1. Descriptive statistics and internal reliability

80.2% of participants regularly use streaming platforms (77.4% are subscribers to one or more platforms); 50.9% watch 1–2 series per month, while 17.0% do not watch any. 34.4% watch 3–4 consecutive episodes per session, while 8.4% watch more than 8. Viewing is predominantly solitary (69.3%) and takes place at home (85.3%).

The WTSMQ, BWESQ and TEXI scales showed good to excellent levels of internal consistency (α ranging from .832 to .970). The total FFMQ showed low internal reliability (α = .516), confirming the appropriateness of interpreting its subscales separately; the Acting with Awareness subscale showed high internal consistency (α = .859).

Table 2: Descriptive Statistics and Internal Reliability of Main Scales (N = 212)

SCALE / SUBSCALE	M	SD	RANGE	A
BWESQ TOTAL	89.81	26.33	40–160	.970
– BINGE-WATCHING	13.05	4.47	6–24	.854
– DEPENDENCY	10.29	3.76	5–20	.834
– LOSS OF CONTROL	14.25	5.47	7–28	.901
WTSMQ TOTAL	47.39	14.48	22–88	.941
– COPING/ESCAPISM	17.42	5.90	8–32	.876
– ENRICHMENT	11.34	3.68	5–20	.832
TEXI TOTAL	47.40	12.45	20–80	.921
– WORKING MEMORY	23.53	6.65	10–40	.880
– INHIBITION	23.87	6.46	10–40	.840
FFMQ TOTAL	114.22	11.01	82–161	.516
– ACTING WITH AWARENESS	27.06	7.17	8–40	.859
– NON-REACT	19.05	5.72	7–35	.777

4.2. Relationships between executive functions, BW and motivations for serial viewing

Table 3 presents the correlation matrix between the TEXI subscales and the BWESQ and WTSMQ scales (N = 212; all significant at $p < .001$). The strongest correlation is found between total TEXI and total BWESQ ($r = .708$), confirming a robust relationship between overall executive difficulties and engagement in BW. The gradient of correlations shows that executive difficulties are more strongly associated with problematic dimensions (Dependency $r = .654$, Loss of Control $r = .651$, Binge-watching $r = .669$) than with positive engagement (Pleasure Preservation $r = .579$, Desire/Savouring $r = .556$), empirically distinguishing dysfunctional BW from non-problematic BW (Pittman & Steiner, 2019). The highest correlations between TEXI and motivations for BW concern Coping/Escapism ($r = .644$), whereas Enrichment shows the lowest value ($r = .508$), confirming H2: executive difficulties are preferentially associated with a regulatory and compensatory function of BW.

TEXI–BWESQ correlations consistently exceed TEXI–WTSMQ correlations, suggesting that executive difficulties are more strongly associated with the subjective experience of viewing – how one experiences BW – than with stated motivations.

Table 3: Pearson Correlations between TEXI Subscales and BWESQ/WTSMQ Scales (N = 212)

	WM	INH	TEXI TOT.
BWESQ TOTAL	.664***	.665***	.708***
– BINGE-WATCHING	.620***	.635***	.669***
– DESIRE/SAVOURING	.498***	.543***	.556***
– ENGAGEMENT	.599***	.585***	.630***
– POSITIVE EMOTIONS	.578***	.614***	.636***
– PLEASURE PRESERVATION	.574***	.517***	.579***
– DEPENDENCY	.610***	.616***	.654***
– LOSS OF CONTROL	.630***	.594***	.651***
WTSMQ TOTAL	.629***	.611***	.660***
– COPING/ESCAPISM	.610***	.600***	.644***
– ENRICHMENT	.477***	.475***	.508***
– EMOTIONAL ENHANCEMENT	.521***	.511***	.549***
– SOCIAL	.555***	.506***	.563***

*Note. WM = Working Memory; INH = Inhibition; TEXI tot. = TEXI Total Score. *** p < .001.*

4.3. Differences by type of institution and gender

Differences by type of school were found to be statistically significant for BWESQ, TEXI, Coping/Escapism, Dependency and Loss of Control (Table 4). Tukey's post hoc tests indicate that Italian lyceums have significantly higher scores than technical and vocational schools for all significant variables, while technical and vocational schools do not differ from one another. This pattern – which is seemingly counterintuitive, given that high TEXI scores indicate greater self-reported executive difficulties – may suggest that high levels of perceived performance pressure contribute, among lyceum students, to serial media consumption primarily serving as a means of stress relief and coping. This finding should be interpreted in an exploratory manner: it does not demonstrate a causal effect of school type, but suggests a hypothesis that warrants further investigation through qualitative and longitudinal studies.

With regard to gender, females showed higher descriptive scores on the BWESQ, Coping/Escapism, Dependency and Loss of Control scales; however, the only

statistically significant difference concerns Dependency (t = 2.30, p = .023, d = .32), with a small effect size. The evidence for gender differences is thus limited and specific to this subscale.

Table 4*:* One-Way ANOVA by School Type: Main Variables (N = 212)

VARIABLE	F(2, 209)	P	H^2
BWESQ TOTAL	15.89	p < .001	.132
TEXI TOTAL	14.99	p < .001	.125
COPING/ESCAPISM	27.73	p < .001	.210
DEPENDENCY	11.50	p < .001	.099
LOSS OF CONTROL	19.08	p < .001	.154
FFMQ TOTAL	0.51	p = .600	.005
ACTING WITH AWARENESS	2.61	p = .076	.024

Note. Tukey's post hoc test: significantly higher scores in Italian lyceums compared with technical and vocational schools for variables with p < .001; technical and vocational schools do not differ from one another. By gender: only Dependency differs significantly, t(208) = 2.30, p = .023, d = .32.

4.4. Multiple linear regression with covariates

The multiple linear regression analysis, with total BWESQ as the criterion variable, included total TEXI, total FFMQ, age, gender, type of school and regular use of streaming platforms as predictors (Table 5). The model proved significant, F(7, 204) = 42.16, p < .001, R^2 = .591, adjusted R^2 = .577. The significant predictors are total TEXI (b = 1.367, SE = 0.109, p < .001, dominant standardised β) and regular use of streaming platforms (b = 17.020, SE = 3.035, p < .001). Total mindfulness, gender, age and type of institution were not found to be significant direct predictors once executive difficulties were controlled for, suggesting that executive functioning is the main explanatory factor associated with problematic BW in this sample.

Table 5: Multiple Linear Regression on BWESQ Total (N = 212)

PREDICTOR	B	SE	B	P
TEXI TOTAL	1.367	0.109	.647	p < .001
FFMQ TOTAL	0.150	0.114	.063	p = .191
AGE	1.102	0.866	.065	p = .205
FEMALE	1.641	2.716	.031	p = .546
GRAMMAR SCHOOL	5.303	4.090	.075	p = .196
VOCATIONAL SCHOOL	1.263	3.019	.023	p = .676
REGULAR STREAMING USE	17.020	3.035	.285	p < .001

Note. $F(7, 204) = 42.16$, $p < .001$, $R^2 = .591$, adjusted $R^2 = .577$. Reference category for school type: technical college.

4.5. Mediation model and robustness/sensitivity analysis

The PROCESS Model 4 (Hayes, 2022) tested the role of total TEXI as a mediator of the relationship between dispositional mindfulness and total BWESQ, using a bootstrap with 5,000 resamples.

Main model (total FFMQ as predictor X). Dispositional mindfulness is associated with lower executive difficulties (path a: b = −0.3173, SE = 0.0895, p < .001, 95% CI [−0.4939; −0.1407]); executive difficulties are in turn associated with higher levels of problematic BW (path b: b = 1.5335, SE = 0.1083, p < .001, 95% CI [1.3297; 1.7567]). The direct effect of mindfulness on BW does not reach statistical significance (path c': b = 0.1449, SE = 0.0798, p = .233, 95% CI [−0.0127; 0.3025]), while the indirect effect via TEXI is significant (b_ind = −0.4867, SE = 0.0724, 95% bootstrap CI [−0.6301; −0.3128]): the absence of zero in the confidence interval indicates a significant indirect effect. This pattern – a non-significant direct effect and a significant indirect effect – is consistent with a mediation structure in the tested model: mindfulness is associated with BW primarily via executive functioning.

Robustness/sensitivity analysis (Acting with Awareness as predictor X). Given the unsatisfactory internal reliability of the total FFMQ (α = .516), a robustness/sensitivity analysis was conducted by replacing the predictor with the Acting with Awareness subscale (α = .859), which is psychometrically more robust and theoretically more relevant to the construct of non-automatic engagement

(Baer et al., 2006). The results replicate the pattern of the main model: Acting with Awareness is associated with lower executive difficulties (path a: b = −1.2390, p < .001); executive difficulties are in turn associated with higher levels of problematic BW (path b: b = 1.3140, p < .001); the direct effect is not significant (b = −0.4470, p = .080); the indirect effect via TEXI is significant (b_ind = −1.6279, 95% bootstrap CI [−2.1670; −1.1340]). The convergence of the two models – both with the composite predictor and with the psychometrically more robust subscale – supports the stability of the mediation pattern and provides evidence of the structural robustness of the result (sensitivity analysis). In all cases, causal language is avoided: the cross-sectional design does not permit causal inference.

Table 6: Mediation Models: TEXI as Mediator, BWESQ as Outcome (PROCESS Model 4; N = 212; Bootstrap = 5,000)

Predictor X	Path *a* (X→M) b	p	Path *b* (M→Y) b	p	Direct path *c'* b	p	Indirect effect *a*×*b* b	95% CI
FFMQ Total	−0.3173	p < .001	1.5335	p < .001	0.1449	p = .233	−0.4867	[−0.6301; −0.3128]
Acting with Awareness (robustness)	−1.2390	p < .001	1.3140	p < .001	−0.4470	p = .080	−1.6279	[−2.1670; −1.1340]

Note. M = total TEXI; Y = total BWESQ. Paths a and b represent associations between mindfulness, executive difficulties and BW. Indirect effects were estimated using bootstrap percentiles; absence of zero in the CI indicates statistically significant mediation. Model 2 (Acting with Awareness) is a robustness/sensitivity analysis. The cross-sectional design prevents causal inference.

5. DISCUSSION

5.1. BW and executive difficulties: towards a pedagogical interpretation

As shown in Table 2, correlations are strongest with the problematic dimensions of BW (Dependency r = .654, Loss of Control r = .651, Binge-watching r = .669) and with Coping/Escapism (r = .644), and weaker with dimensions of positive

engagement. This pattern suggests that adolescents with greater difficulties in inhibitory control and working memory show higher involvement across all dimensions of BW, but especially where viewing takes the form of an experience that eludes voluntary control, such as loss of control, dependency and difficulty in stopping. This interpretation is consistent with evidence on executive functions as mechanisms of self-regulation and with developmental accounts locating their maturation in late adolescence, a stage particularly vulnerable to environments designed to capture and retain attention.

At the same time, the EF–BW relationship should not be read as linear causality. Executive difficulties are also associated with positive dimensions of BW (Engagement r = .630, Positive Emotions r = .636), suggesting that, for some adolescents, BW may partly function as an adaptive response to needs for regulation and compensation. The Social subscale (r = .563) adds an important element: for many adolescents, BW is not an isolated activity but a practice of shared narrative belonging – viewing as a pretext for conversation, exchange and group affiliation. The educational task is therefore not to deprive adolescents of this social dimension, but to help them distinguish between genuine sharing and relational withdrawal masked as social interaction

5.2. The mediation model: theoretical and operational implications

The convergent profile of the two mediation models – both in the full FFMQ analysis and in the robustness/sensitivity analysis using Acting with Awareness – yields a structurally stable result: the direct effect of mindfulness on BW is not statistically significant in either model, while the indirect effect via TEXI is significant in both. In a cross-sectional design, the consistency of the pattern under different psychometric conditions (composite predictor with $\alpha = .516$ vs. subscale with $\alpha = .859$) supports the methodological robustness of the result.

From a theoretical perspective, this configuration is consistent with the hypothesis that mindful awareness does not act as a direct inhibitor of the desire to watch, but rather as an enhancement of the metacognitive resources that govern choice. In line with Zimmerman's (2000) model, mindfulness enhances the ability to monitor one's internal states, recognise the signs of automatic viewing, and deliberate on an alternative. The Acting with Awareness subscale captures precisely this dimension: it is not a matter of 'being mindful' in a general sense, but of being able to recognise the moment when the next episode is initiated not by choice, but by algorithmically induced inertia. In practical terms, this implies that interventions promoting mindfulness in school settings – such as dedicated programmes tailored to adolescents or mindful media literacy practices (Hanly, 2024) – have a sound self-regulatory rationale for addressing problematic BW, by focusing not on the symptom itself but on the cognitive conditions that make it more likely.

The most significant finding from a pedagogical perspective concerns the results of the multiple regression analysis: in the overall model (R^2 = .591), executive difficulties and regular use of streaming platforms are the only significant predictors. Gender and type of school lose their significance when executive difficulties are controlled for. This suggests that the educational issue should not be attributed primarily to identity-based or school-related categories, but rather to the self-regulatory processes that enable intentional use. The finding regarding Italian lyceums remains important as a contextual indicator – in some settings, binge-watching can serve as a form of relief from demands perceived as pressing – but requires further investigation through qualitative and longitudinal studies.

6. PEDAGOGICAL IMPLICATIONS

6.1. Educational care as a normative foundation

The enhancement of executive functions through mindfulness as a mediating approach, as suggested by both models in Table 6, represents an empirically grounded educational objective that can be pedagogically integrated into the mainstream school setting. The literature on school-based interventions documents the effectiveness of mindfulness-based programmes in enhancing self-regulation and stress management (Schonert-Reichl & Lawlor, 2010); the most effective interventions for preventing problematic internet use are based on enhancing self-control, critical awareness and decision-making skills, rather than on blanket bans (Martínez-Hernández & Lloret-Irles, 2024). Educational care is not an addition to the curriculum: it is the prerequisite for any learning to be authentic rather than merely adaptive; a school that provides care does not shield adolescents from the present but helps them to build the resources to navigate it with clarity.

6.2. Concrete interventions in school practice

Translating data into school practices requires interventions at three levels. At the relational level, educational care manifests itself in the teacher's ability to recognise the signs of compulsive screen use – loss of attention, drowsiness, social withdrawal, procrastination – not as disciplinary problems but as indicators of unmet emotional regulation needs (Noddings, 1984). At the curricular level, digital media education should include modules on understanding the algorithmic mechanisms used to capture attention, on metacognitive reflection on one's own usage habits, and on practising basic mindfulness and time-management techniques. At an institutional level, organisational responsibility implies that schools must actively create educational counter-environments – spaces for rest, presence and unmediated social interaction – in which adolescents can experience forms of fulfilment and a sense of belonging that do not depend on technological mediation (Tronto, 1993).

6.3. The school as a counter-learning environment

Whilst digital environments are designed to hold attention and suppress voluntary interruption, the school must offer educational counter-environments in which it is possible to learn to pause, set limits, make reflective choices and take responsibility. This is not anti-technology rhetoric: it is a practical guideline based on the evidence that executive functions develop through experience in environments that require them. A school that structures time, values presence, requires delayed gratification and offers relationships in which the individual is recognised in their complexity is a school that effectively trains executive functions – the key mediator between mindfulness and problematic BW identified by both models presented. It is not a matter of setting permitted viewing times, but of constructing an educational programme centred on the development of individuals capable of inhabiting their own experience with intention and responsibility. The Platonic metaphor of education as periagoge – a turning of the gaze, a turning towards the light – suggests that the task lies not outside the individual but within: it is a process of self-formation that the school can support but not replace. Educating for BW therefore means, in this sense, educating in temporality, in the threshold, in interruption and in presence: emerging from the digital cave is not the abolition of shadows, but the attainment of a gaze that knows how to recognise and interpret them.

7. CONCLUSIONS

The study documented a robust association between executive difficulties and problematic BW in a sample of 212 adolescents from Puglia, with a mediation pattern – corroborated by a robustness/sensitivity analysis – that identifies dispositional mindfulness as a variable associated with executive functioning and, indirectly, with problematic engagement in BW. The convergence of the two

models (FFMQ total and Acting with Awareness), under different psychometric conditions, supports the stability of the statistical pattern in a cross-sectional design.

These data are not merely a contribution to the psychological literature on BW: they also pose a question to school pedagogy. If executive difficulties are both associated with problematic BW and constitute a key target for mindfulness-based interventions, and if schools can create environments that strengthen these resources, then the issue of adolescent BW should not be relegated exclusively to clinical settings but recognised as an educational challenge.

Pedagogy, in constant dialogue with psychology and neuroscience, has the responsibility to interpret phenomena in the light of a theory of education centred on the subject in their entirety. The hyperconnected adolescent is not a problem to be solved: they are a subject in formation who inhabits a world in which the boundaries between real experience and simulacrum, between chosen time and occupied time, are constantly being redrawn. A school capable of providing care – with rigour, presence and pedagogical intelligence – is one that helps adolescents to emerge from the cave while carrying with them, rather than abandoning, the complexity of their lived experience.

Emerging from the 'digital cave' does not entail abandoning screens or morally condemning BW as a practice: it entails acquiring a perspective – that turning of the neck which Platone attributes to education as a 'conversion' of the soul (Republic, 518d) – capable of recognising shadows for what they are, questioning their origin and integrating them into the conscious formation of the self. Ultimately, this is the task that educational care – in its relational, curricular and institutional forms – is called upon to assume in contemporary upper secondary schooling: not to remove

adolescents from the cave, but to accompany them in the process of recognition and choice that transforms automatic consumption into interpreted experience.

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